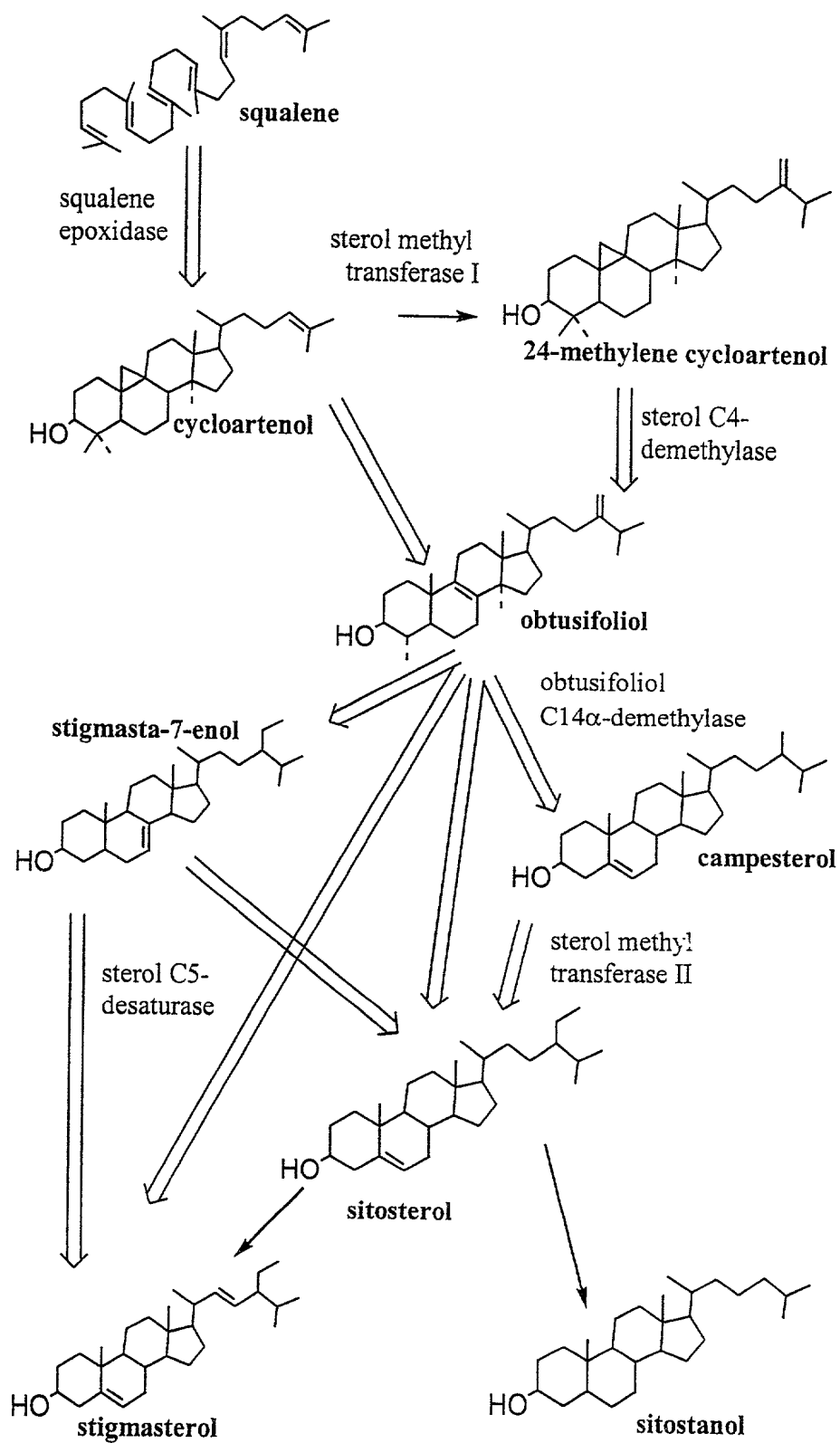


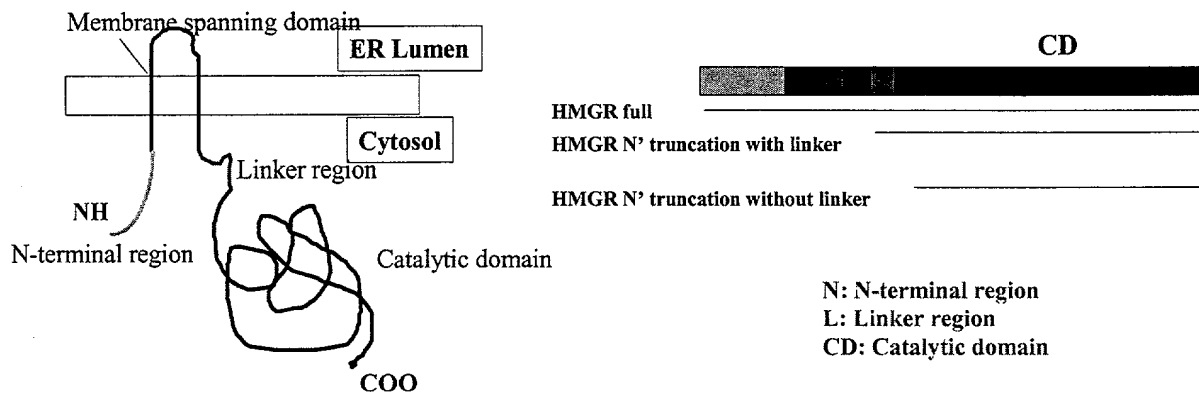
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FIG. 1



T00390" 63453910

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**Figure 2: Forms of *Arabidopsis* and rubber HMGR1 tested in *Arabidopsis* and yeast to compare expression, activity and sterol production.**

090613.0001

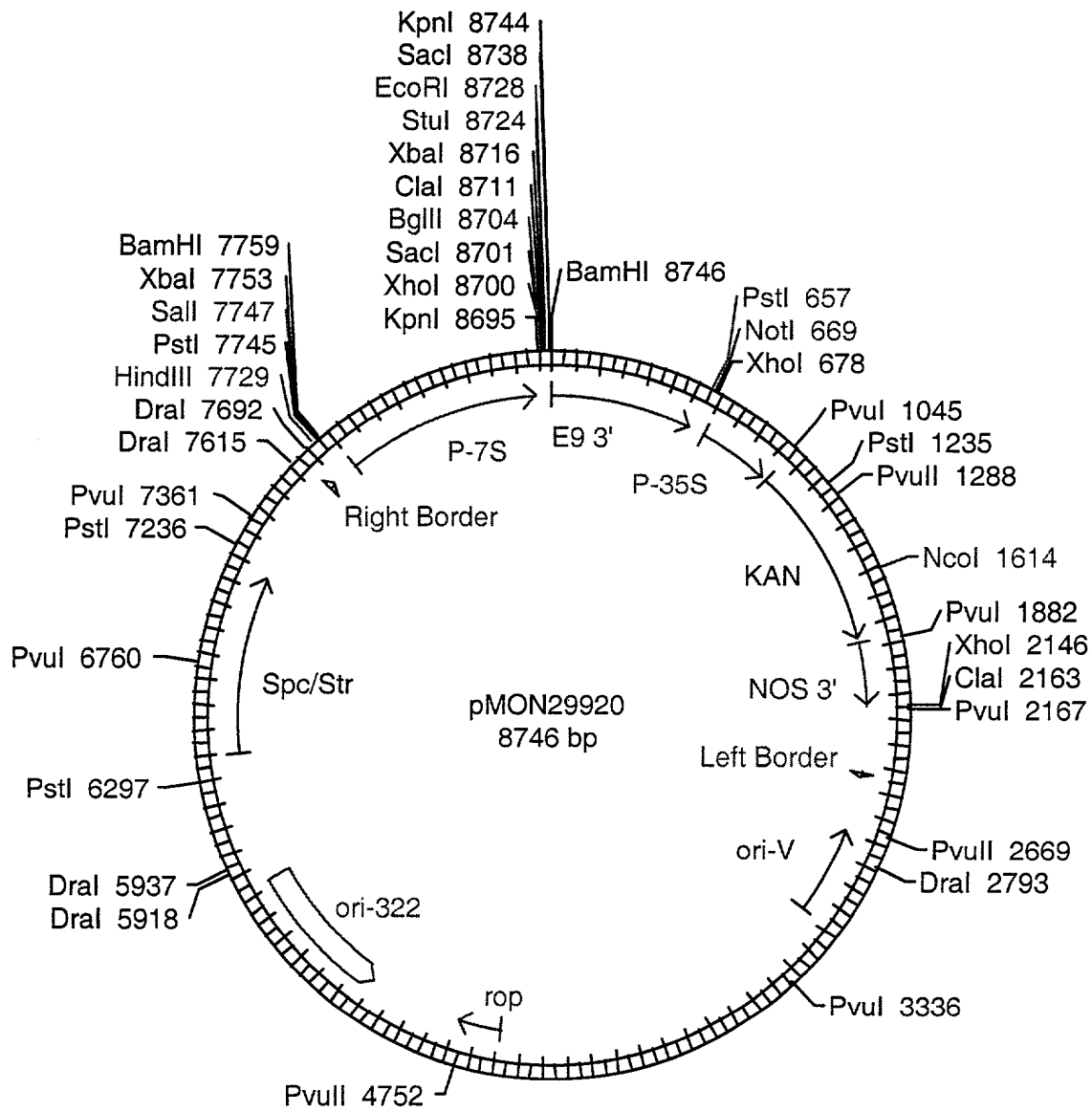


Figure 3: Construct pMON29920

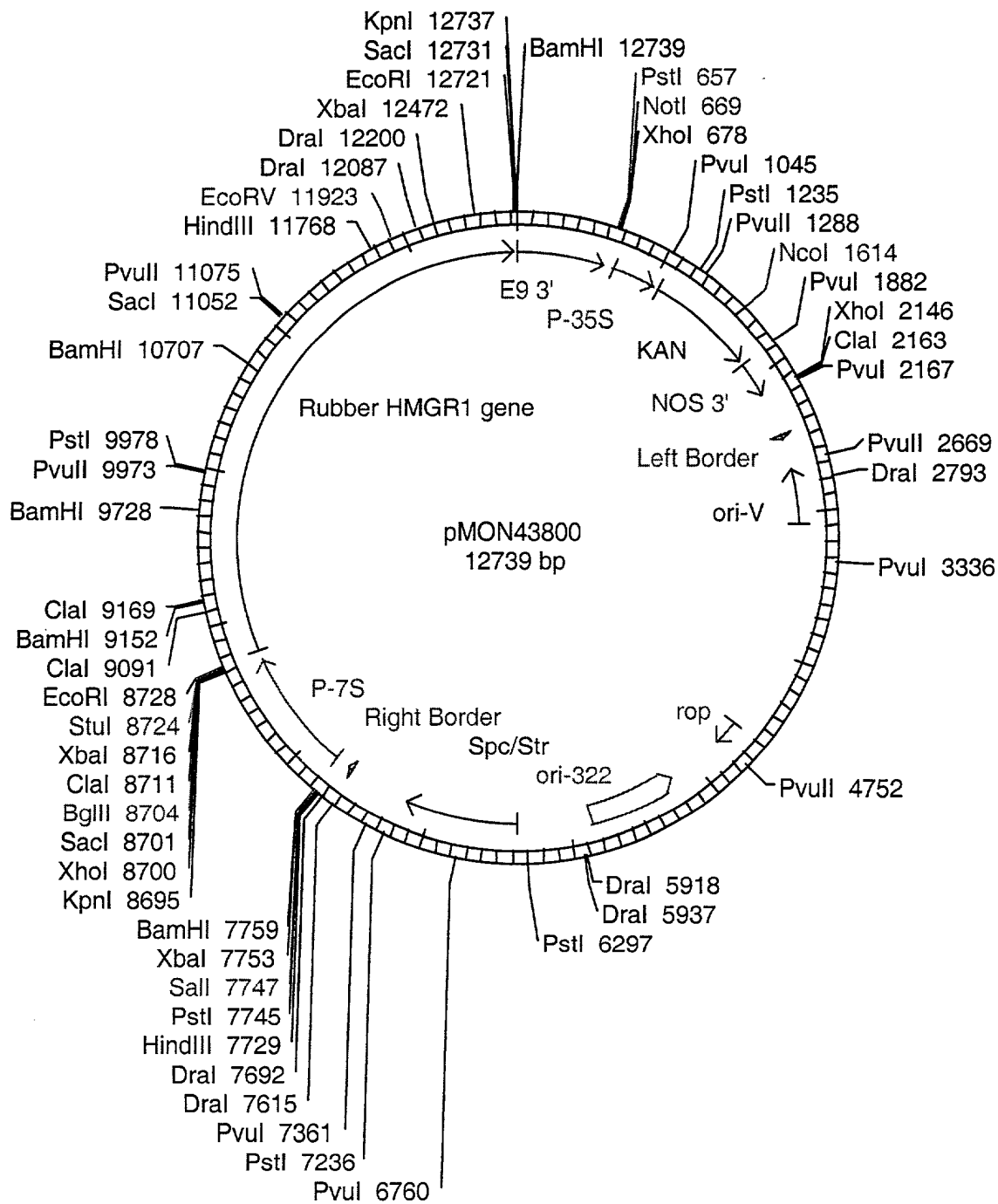


Figure 4: Construct pMON43800

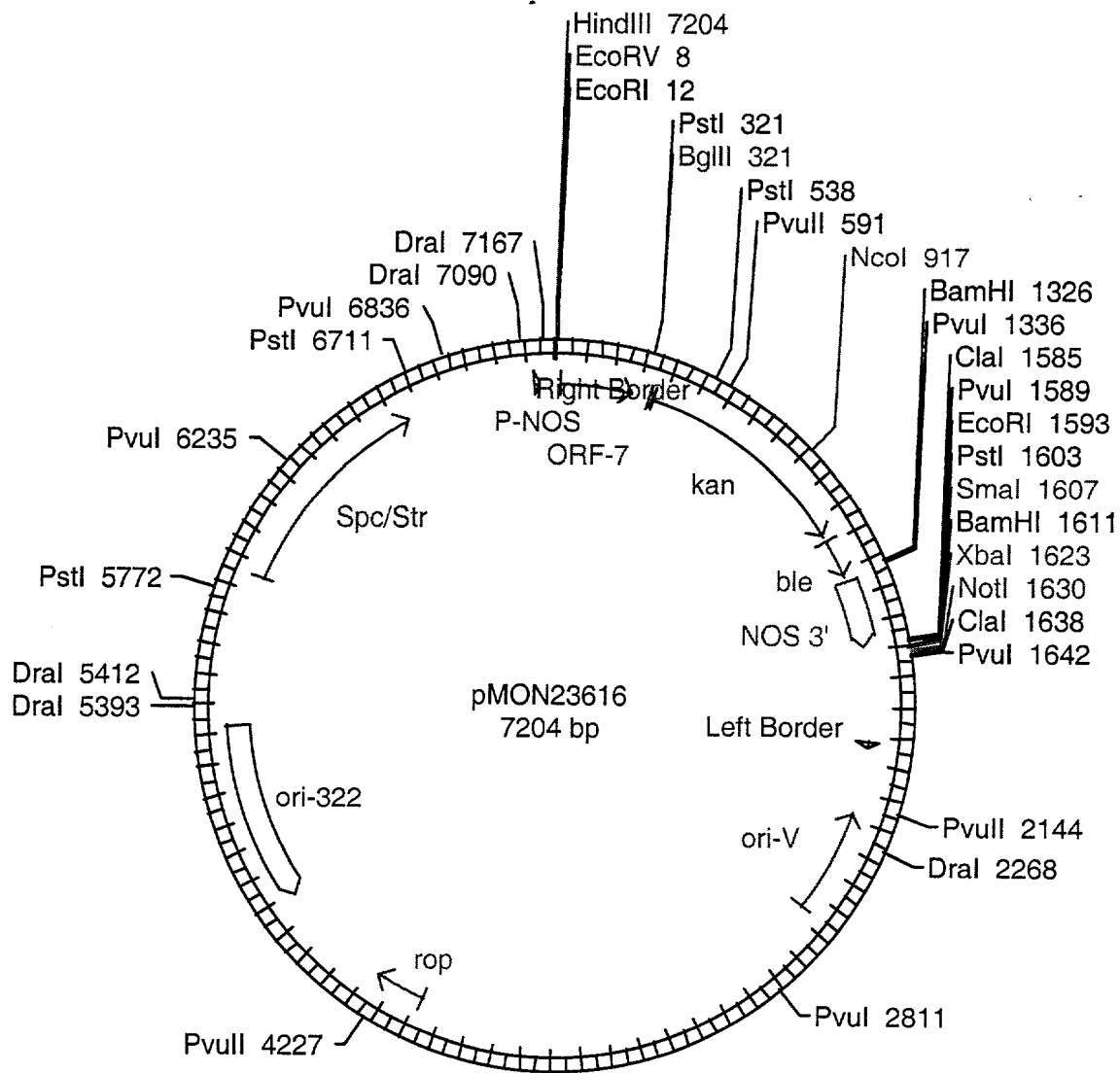


Figure 5: Construct pMON23616

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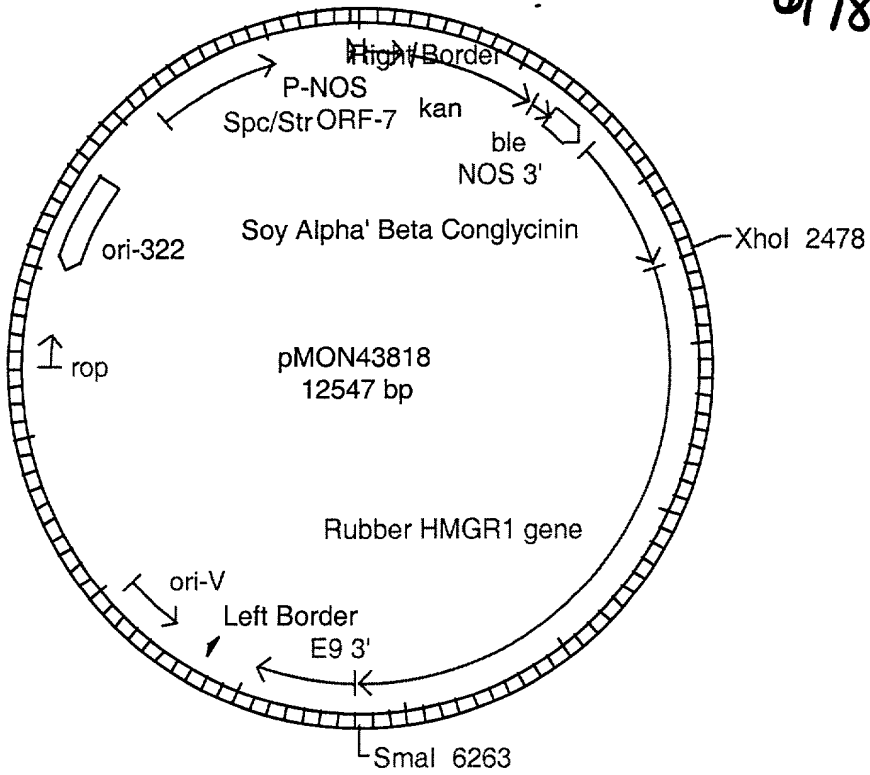


Figure 6: Construct pMON43818

1002930 02258860

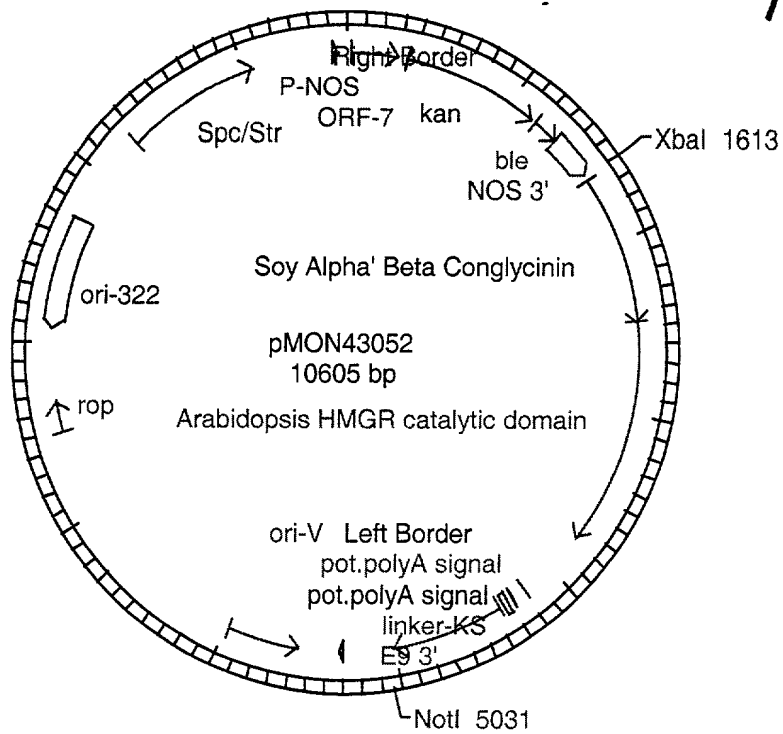
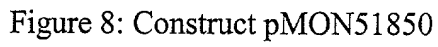
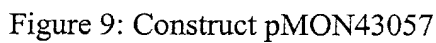


Figure 7: Construct pMON43052





| Variable   | Mean    |      | SD      |      | t       |      | p       |       |
|--|---------|------|---------|------|---------|------|---------|-------|
|  | Control | Case | Control | Case | Control | Case | Control | Case  |
| Age  | 30.5    | 30.5 | 1.2     | 1.2  | 0.0     | 0.0  | 0.999   | 0.999 |
| Gender   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Education  | 12.0    | 12.0 | 1.0     | 1.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Marital status   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Occupation   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Income   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Religion   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Health status  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Family size  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental education   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental occupation  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental income  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental religion  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental health status   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental family size   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental education                                      | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental occupation                                     | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental income   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental religion                                       | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental health status                                  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental family size                                    | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental education                             | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental occupation                            | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental income                                | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental religion                              | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental health status                         | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental family size                           | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental education                    | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental occupation                   | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental income                       | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental religion                     | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental health status                | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental family size                  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental education           | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental occupation          | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental income              | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental religion            | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental health status       | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental family size         | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental parental education  | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental parental occupation | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental parental income     | 1.0     | 1.0  | 0.0     | 0.0  | 0.0     | 0.0  | 0.999   | 0.999 |
| Parental parental parental parental parental parental religion   |         |      |         |      |         |      |         |       |



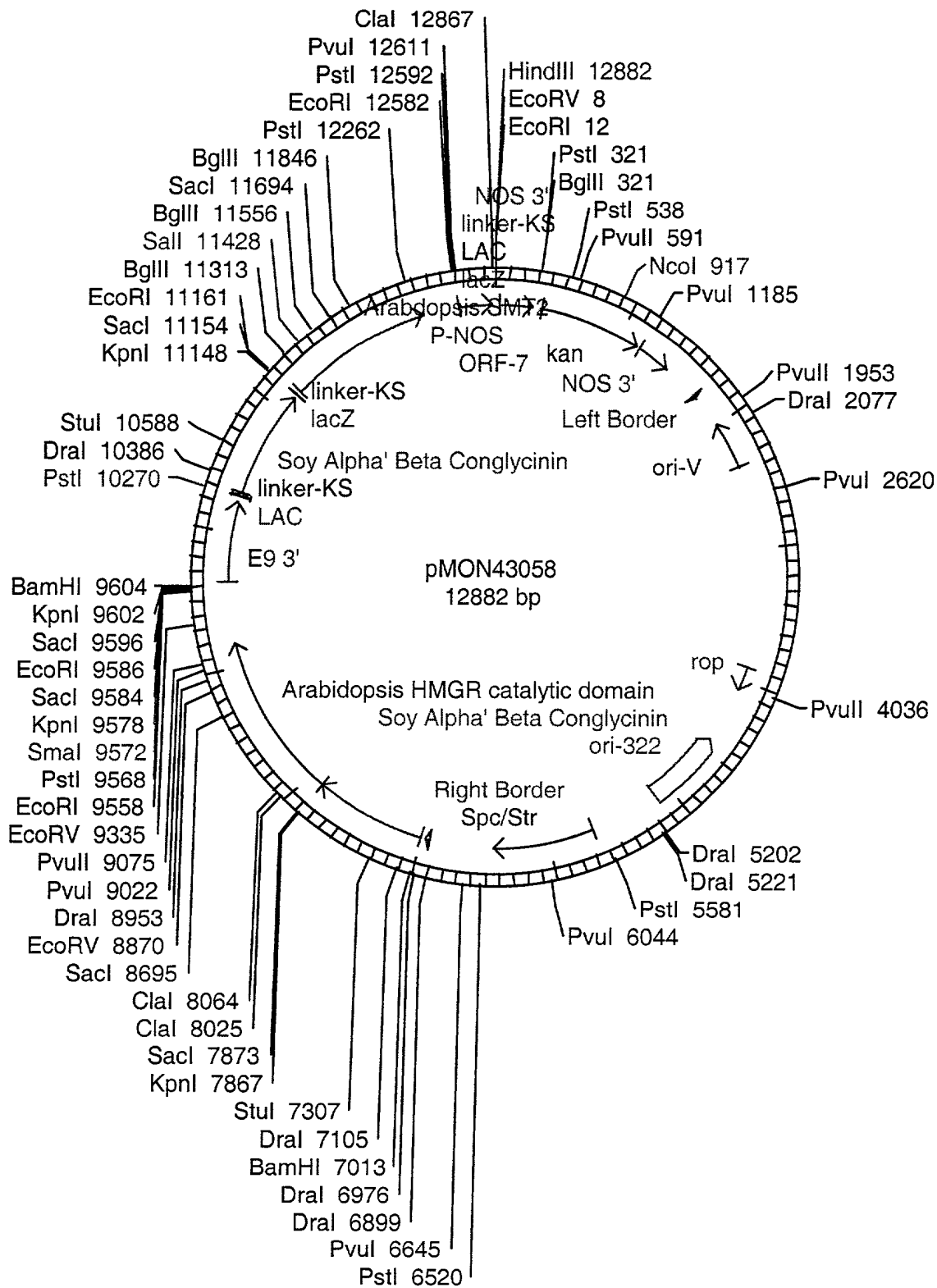


Figure 10: Construct pMON43058

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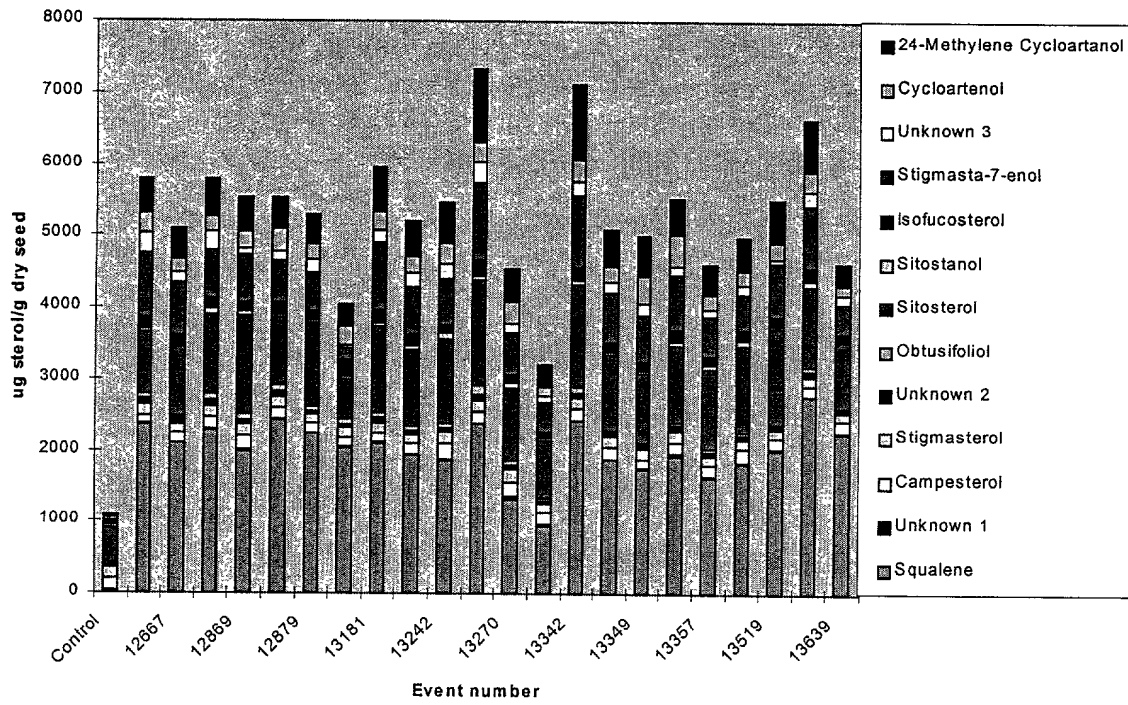


Figure 11: Sterol composition of R1 transgenic soybean seeds when *Arabidopsis* truncated HMGR (catalytic domain without linker) was overexpressed using seed-specific 7S promoter ( data from pMON43057: p7s::At HMGR truncated).

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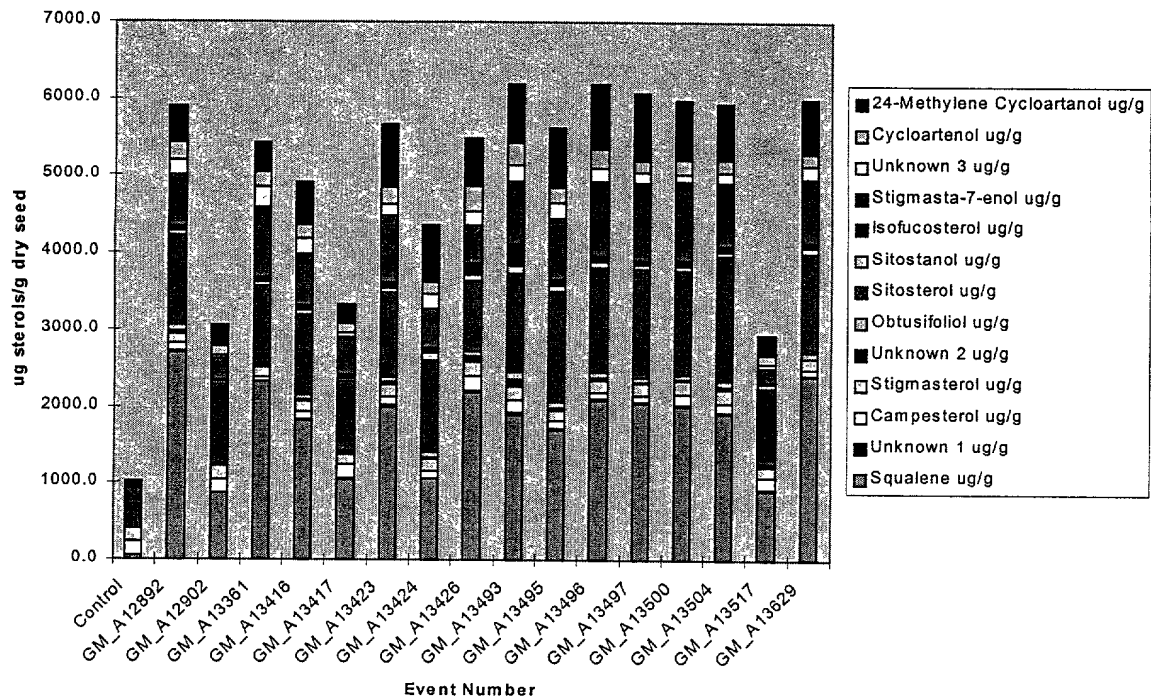
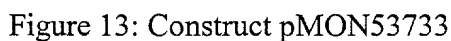


Figure 12: Sterol composition of R1 transgenic soybean seeds when *Arabidopsis* truncated HMGR (catalytic domain without linker) and *Arabidopsis* SMTII were overexpressed (data from pMON43058: p7S::At HMGR truncated & p7S::At SMTII). The expression of the genes is controlled by the seed-specific 7S promoter.

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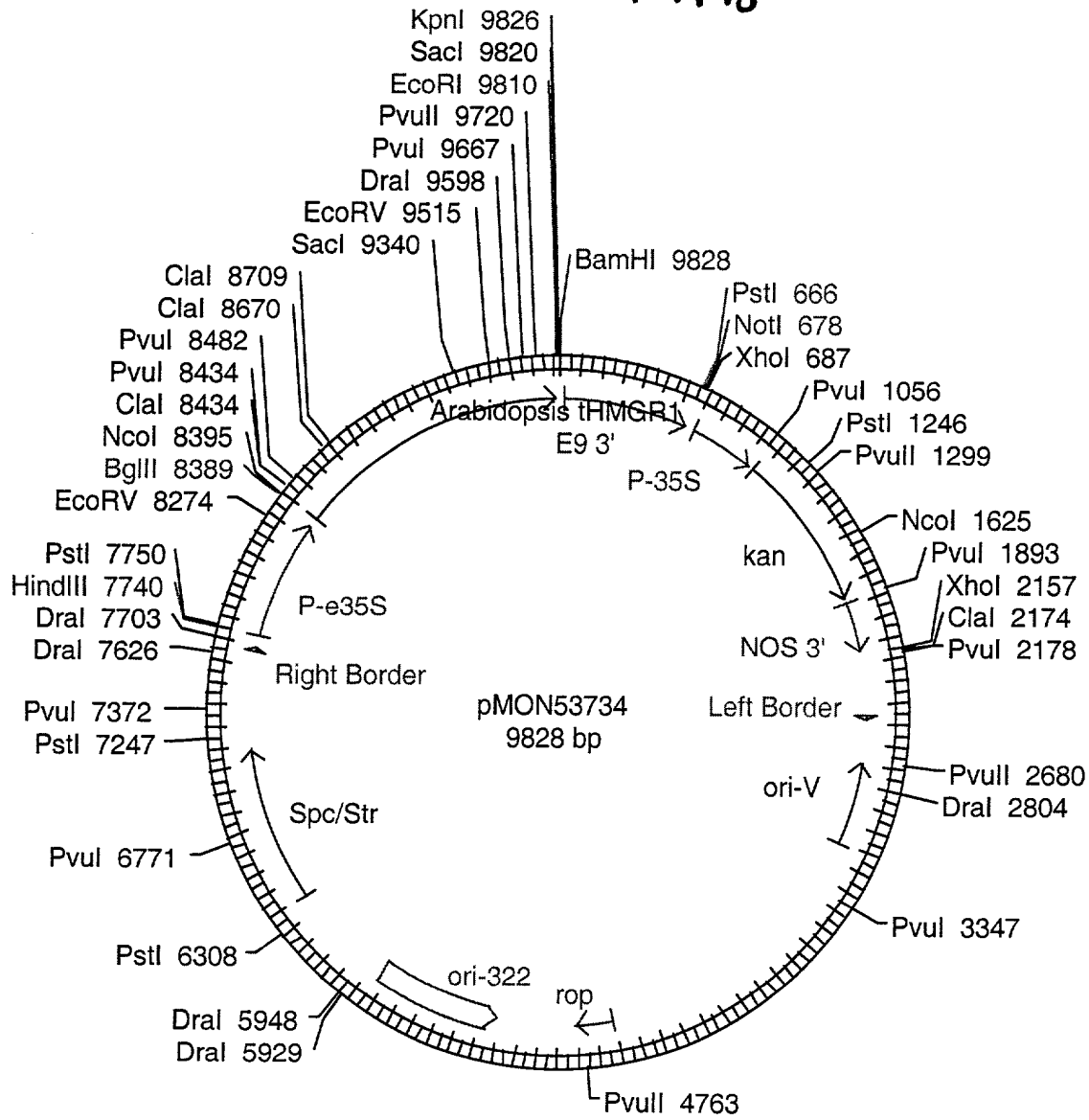


Figure 14: Construct pMON53734

FIG. 14

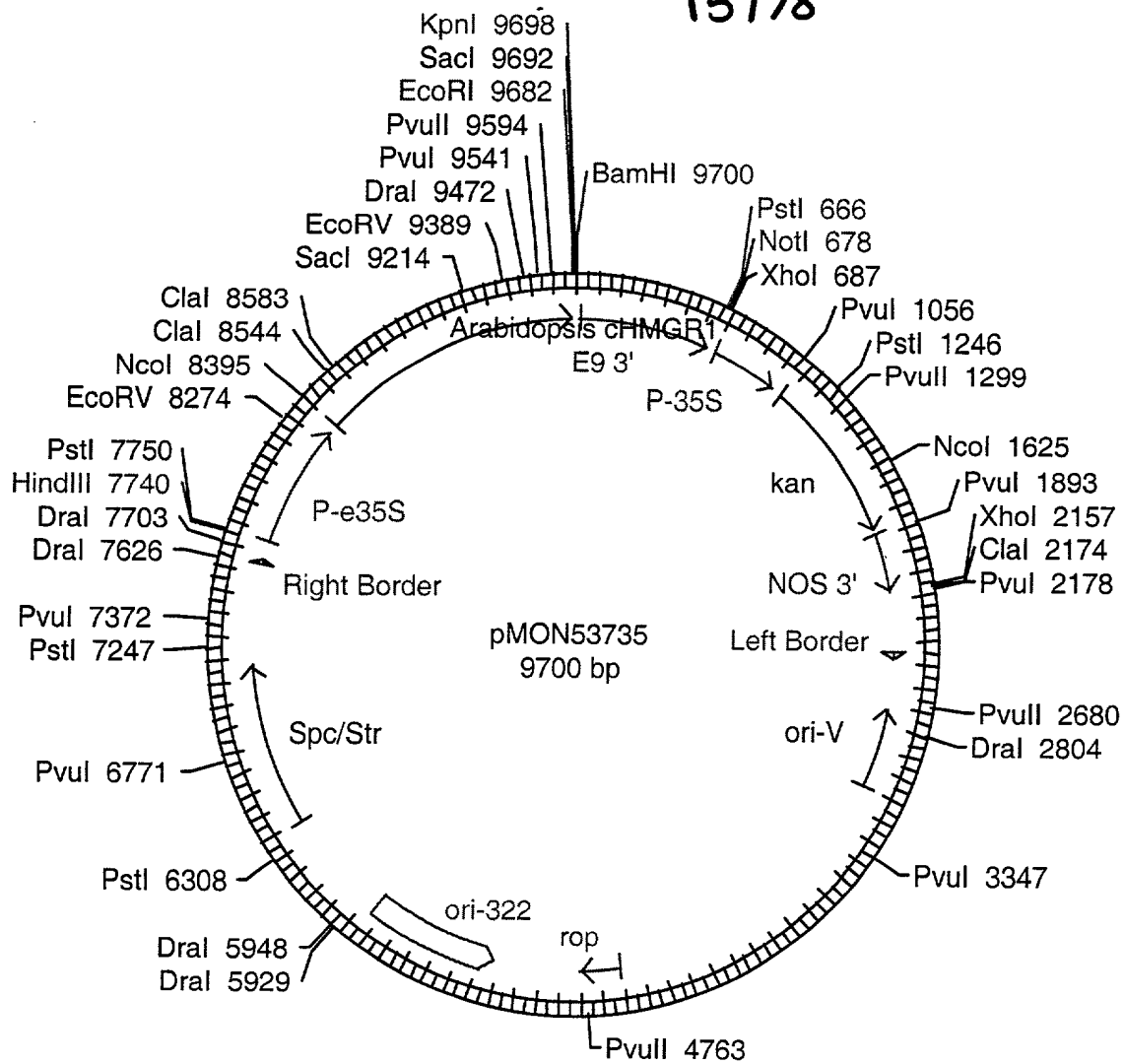


Figure 15: Construct pMON53735

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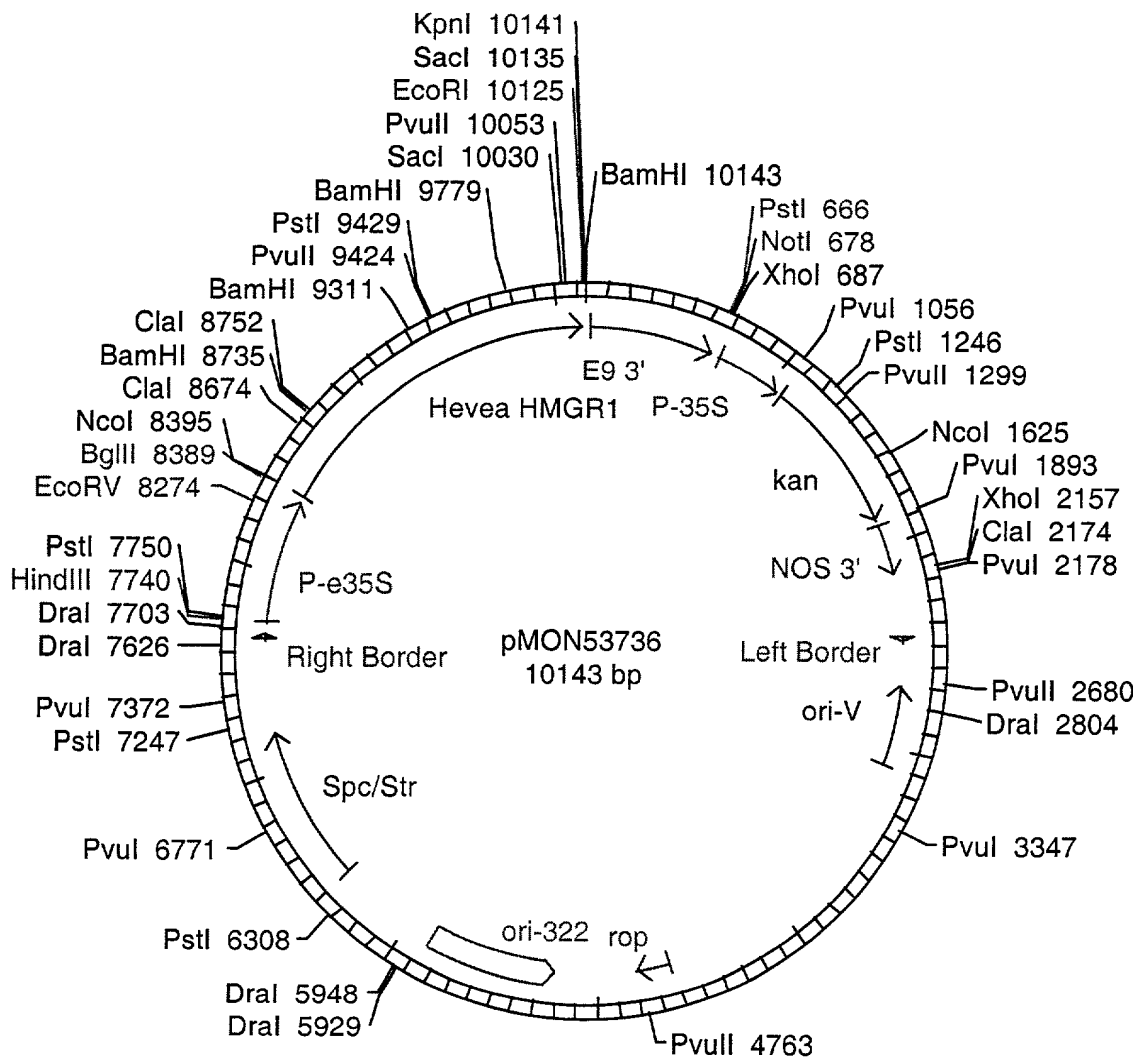


Figure 16: Construct pMON53736



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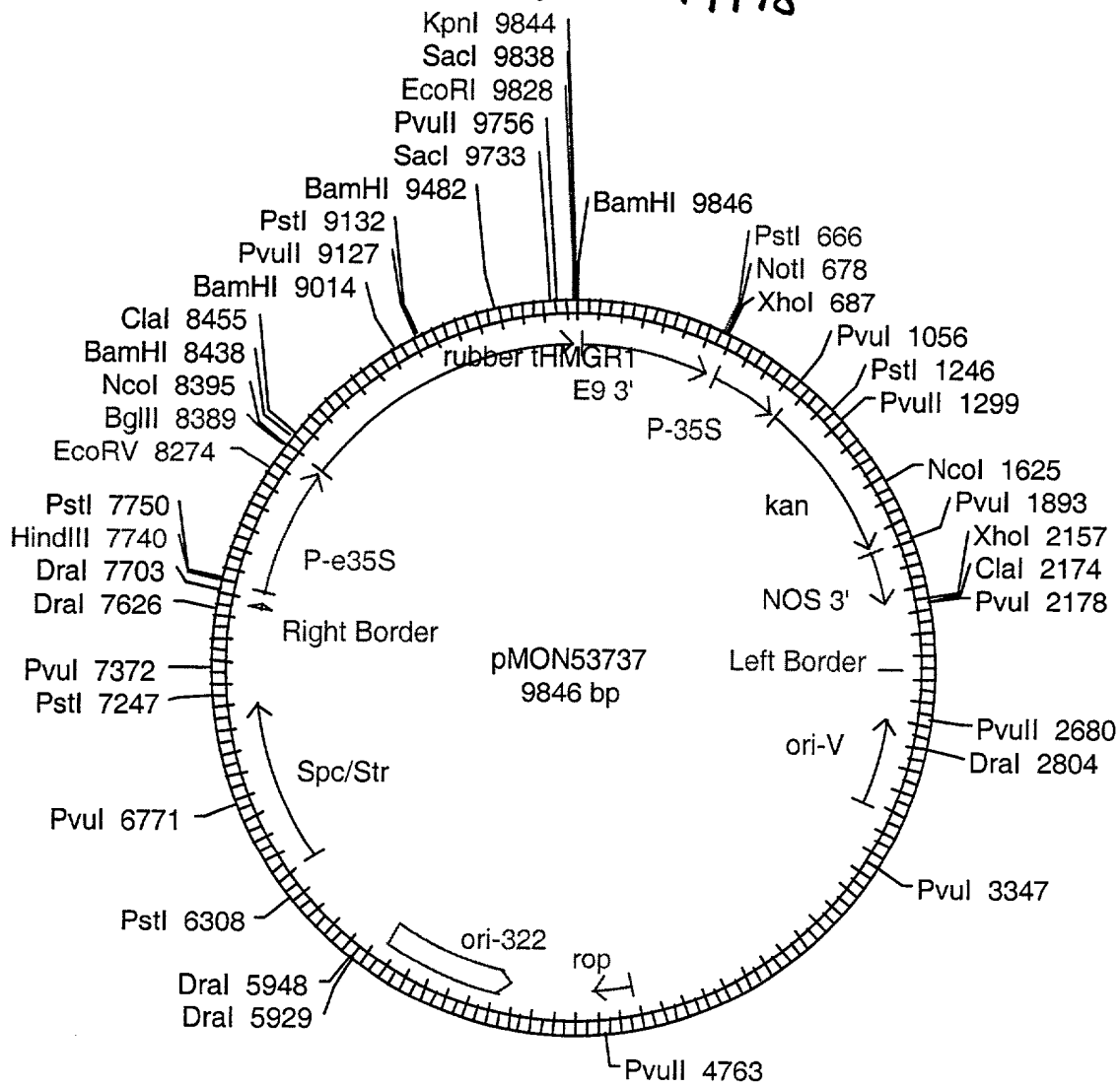


Figure 17: Construct pMON53737

100290" 52458860

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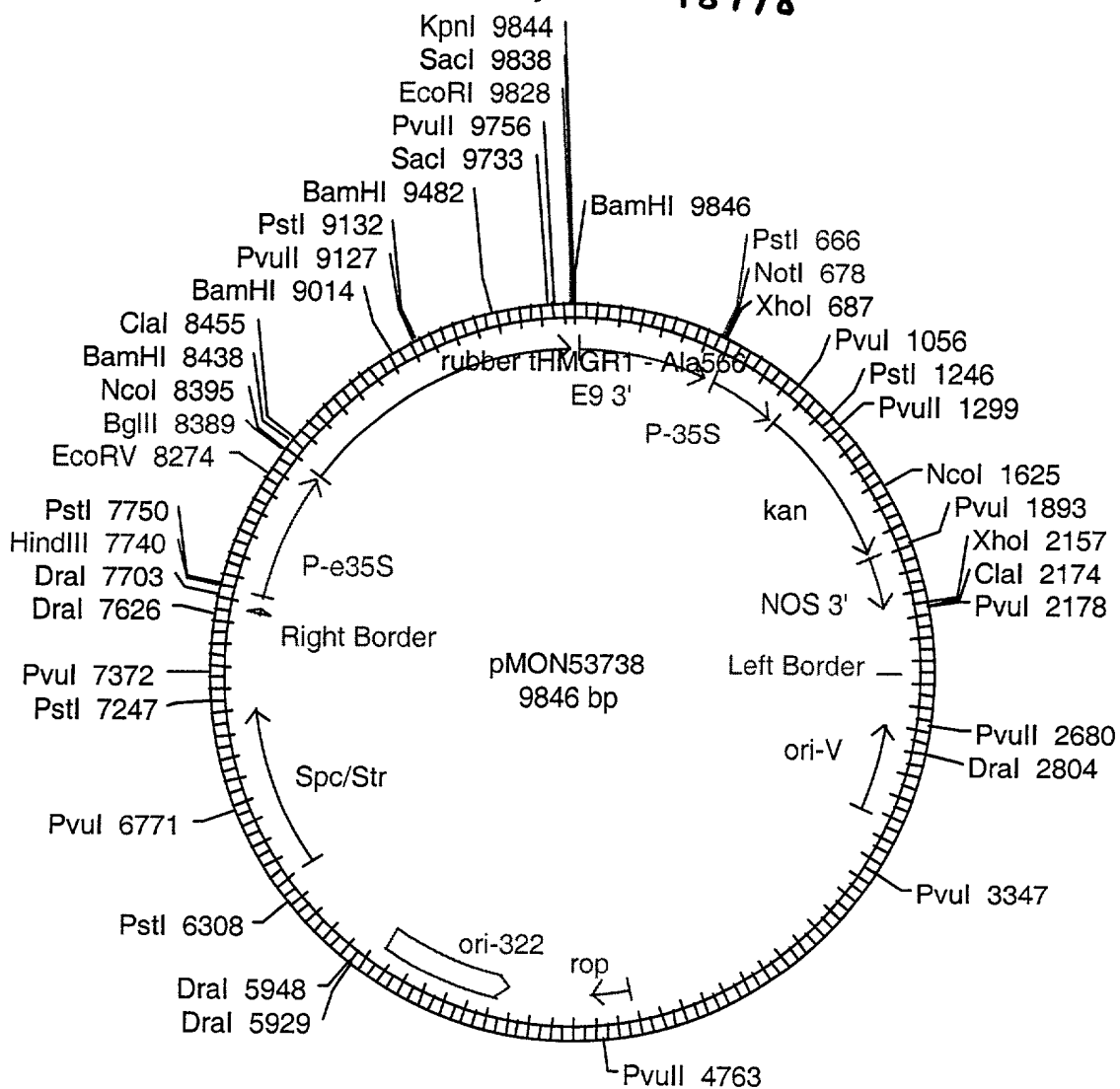


Figure 18: Construct pMON53738

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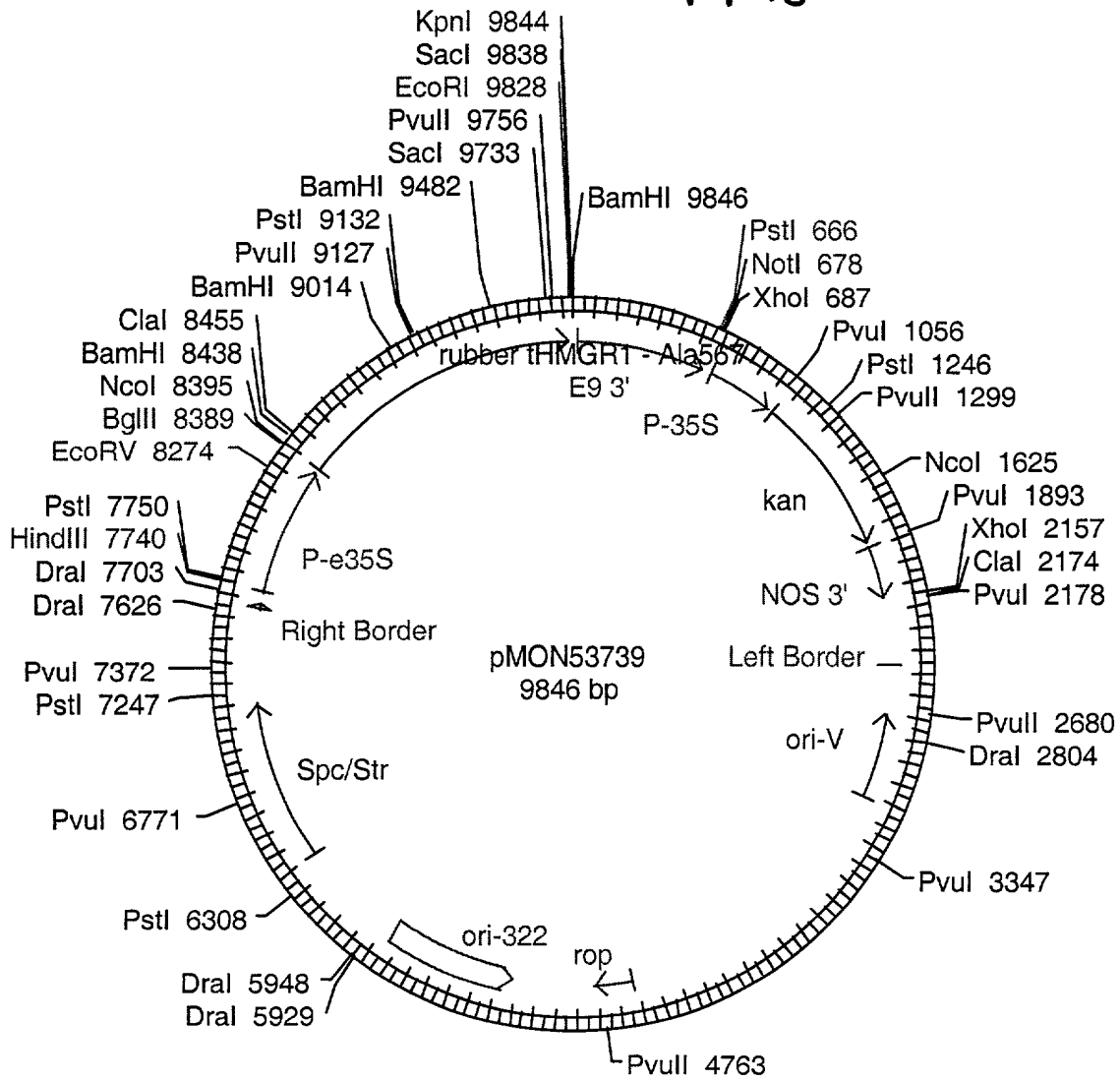


Figure 19: Construct pMON53739

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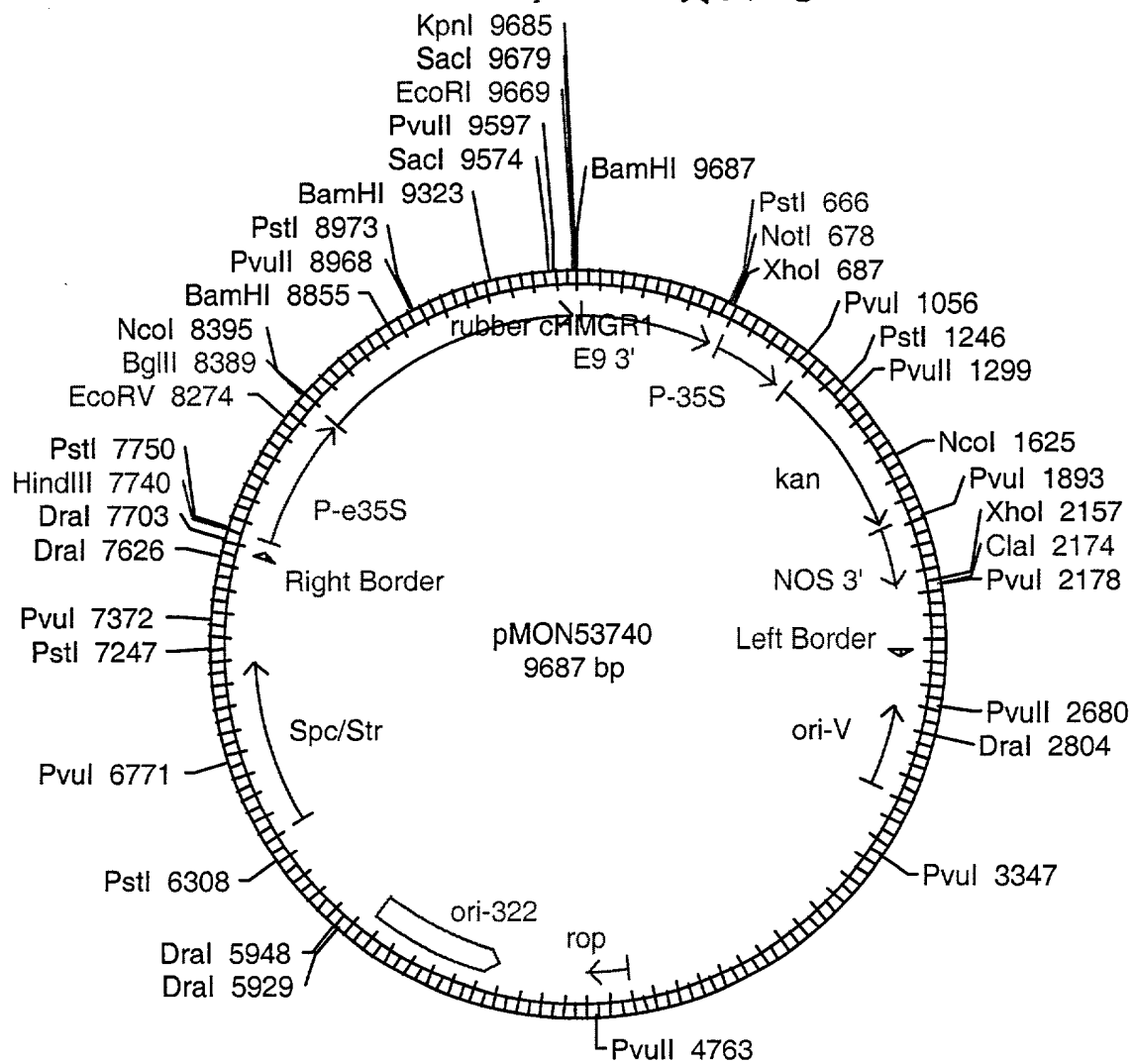


Figure 20: Construct pMON53740

# Comparison of Cycloartenol Levels in Transgenic Plants

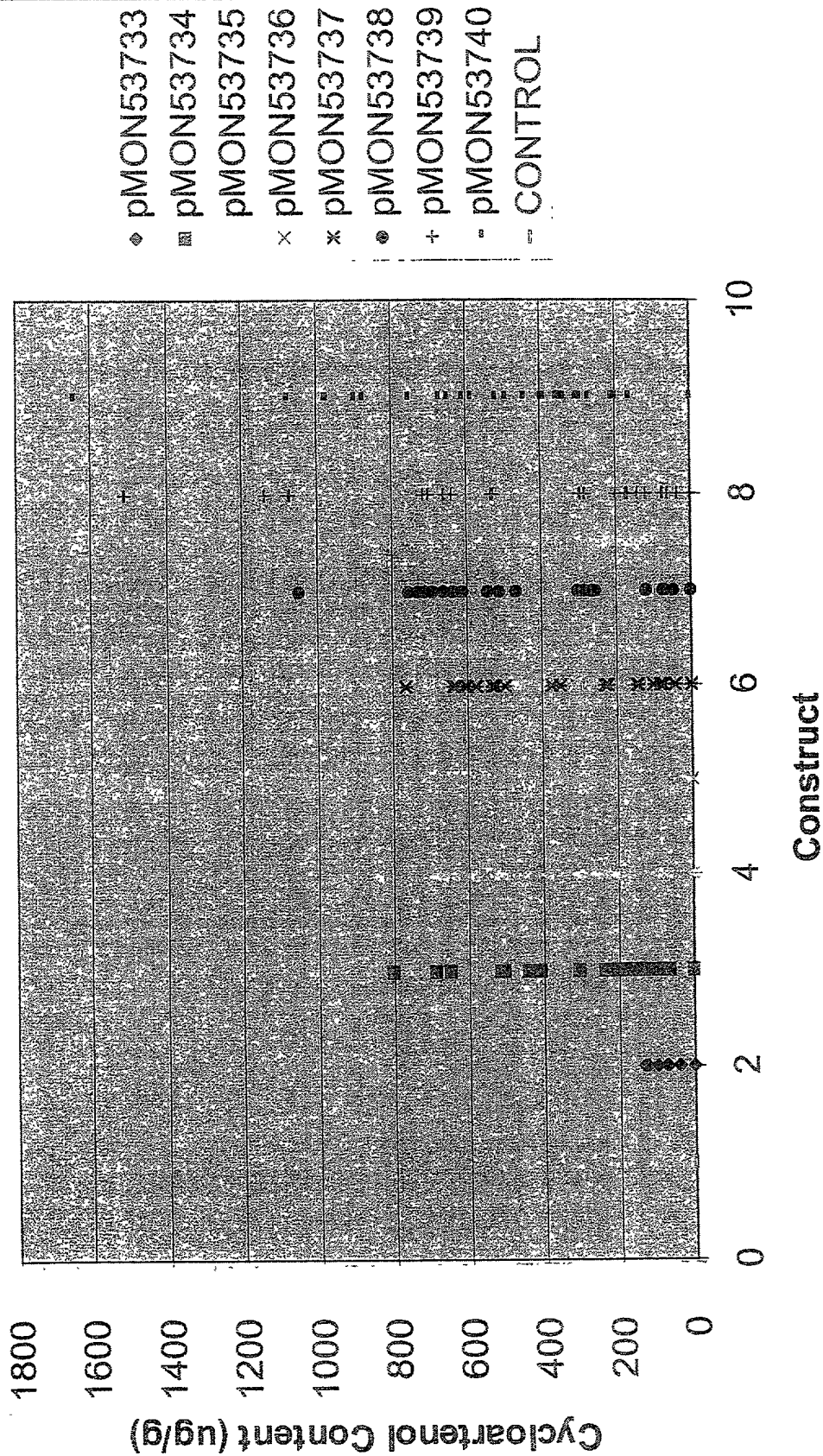


FIGURE 21

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# Comparison of 24-Methylene Cycloartenol in Transgenic Plants

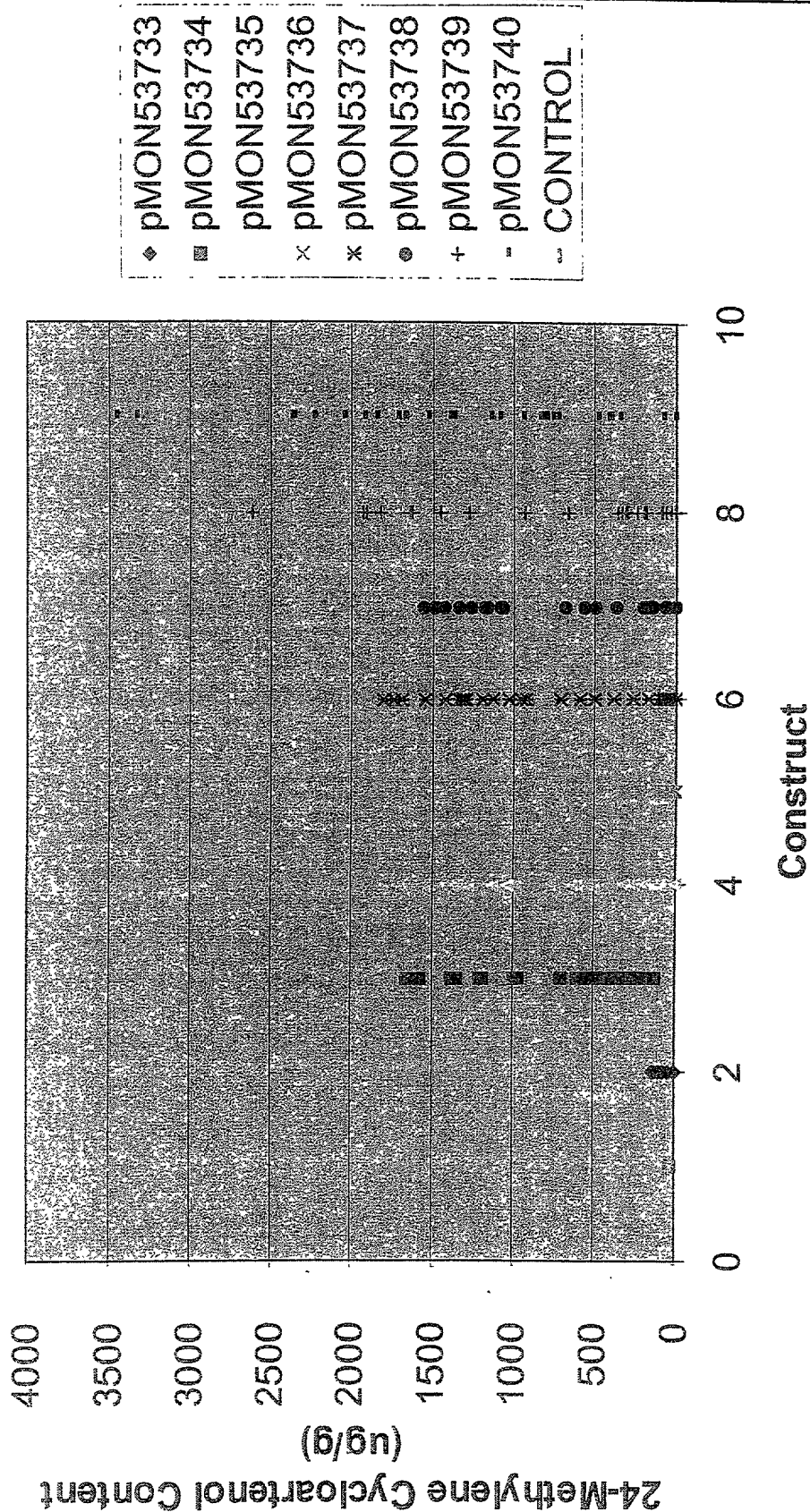


FIGURE 22

# Comparison of Obtusifolios Levels in Transgenic Plants

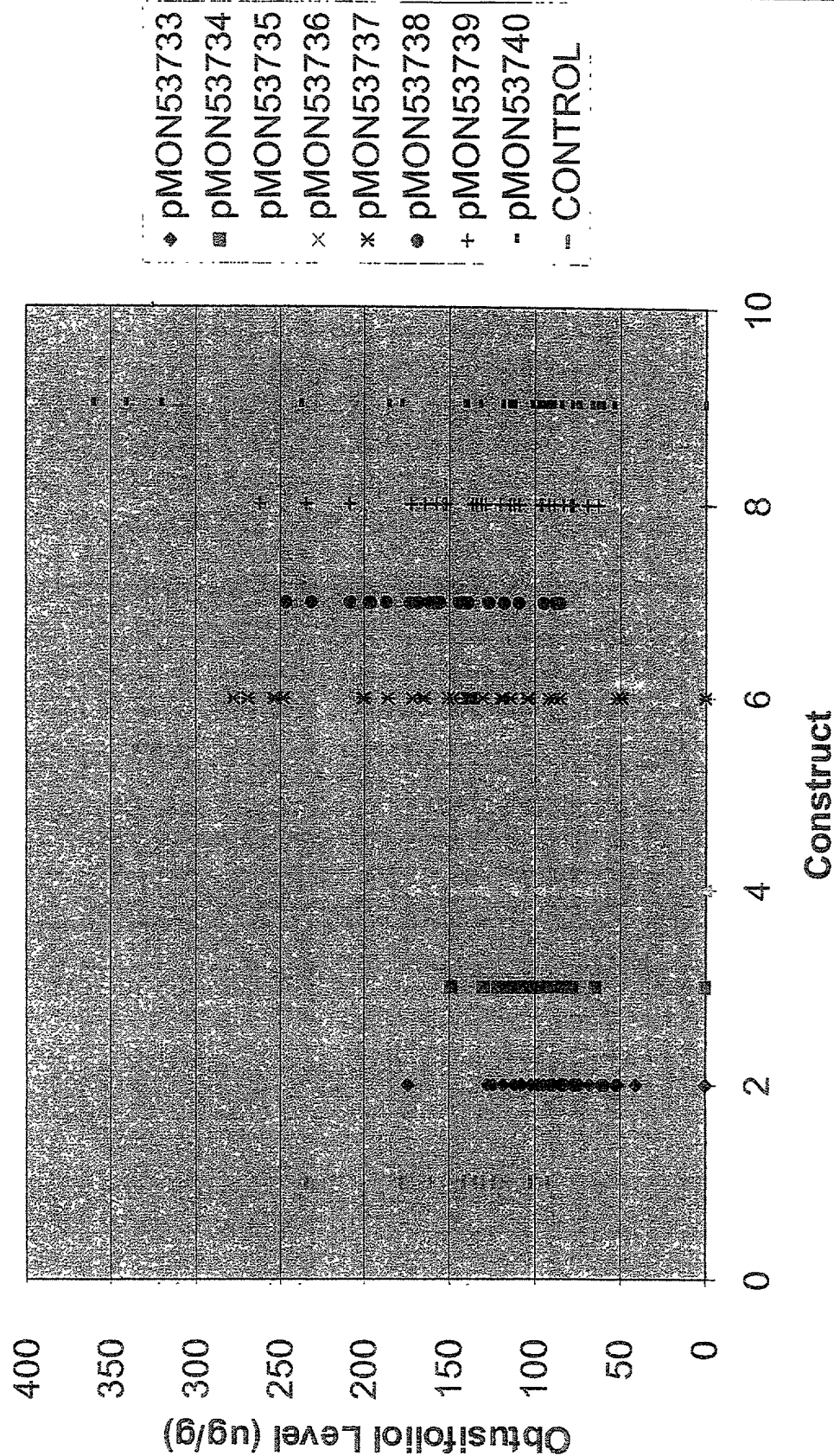


FIGURE 23



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# Comparison of Campesterol Levels in Transgenic Plants

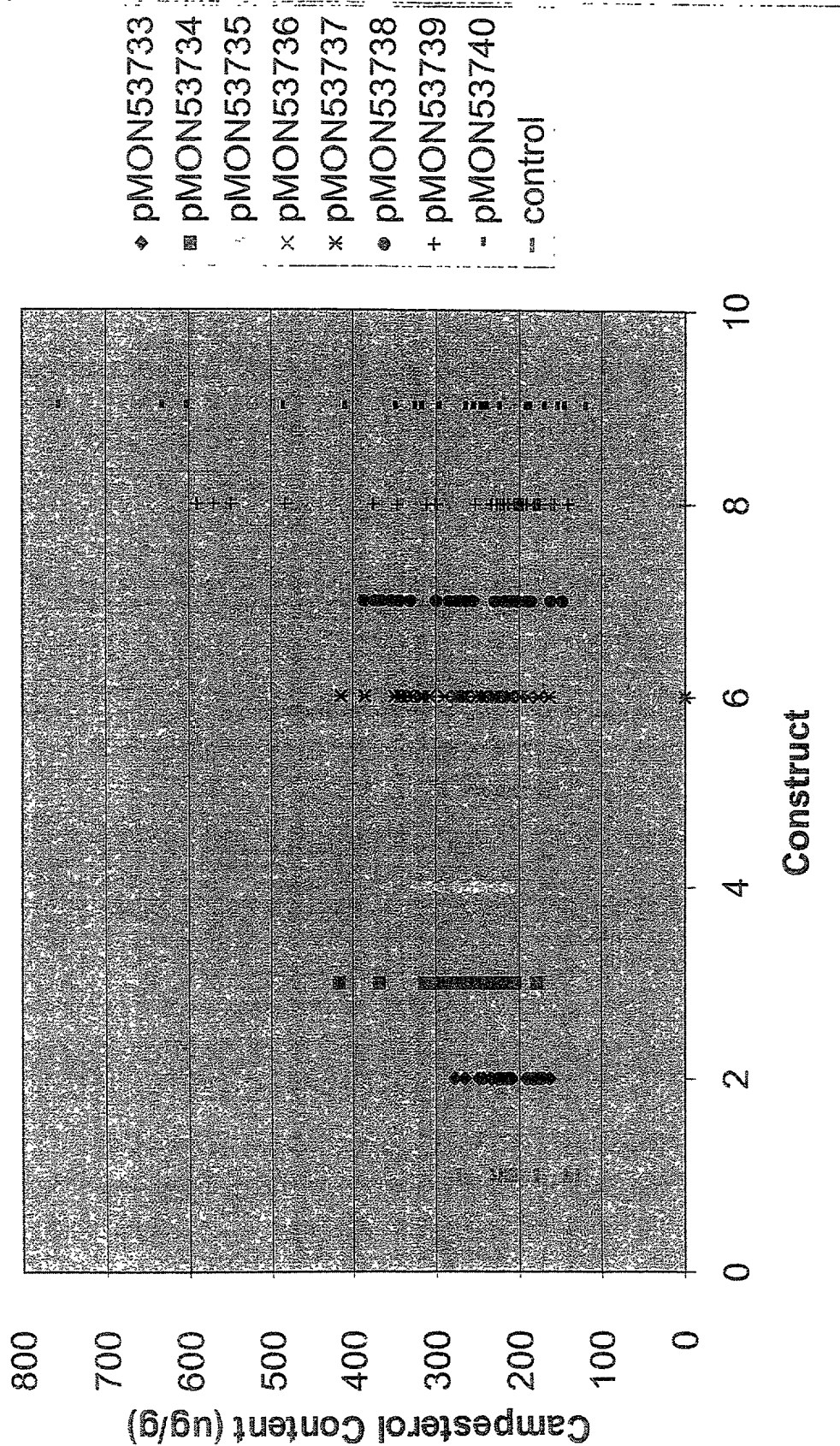


FIGURE 24



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Comparison of Sitosterol Levels in Transgenic Plants

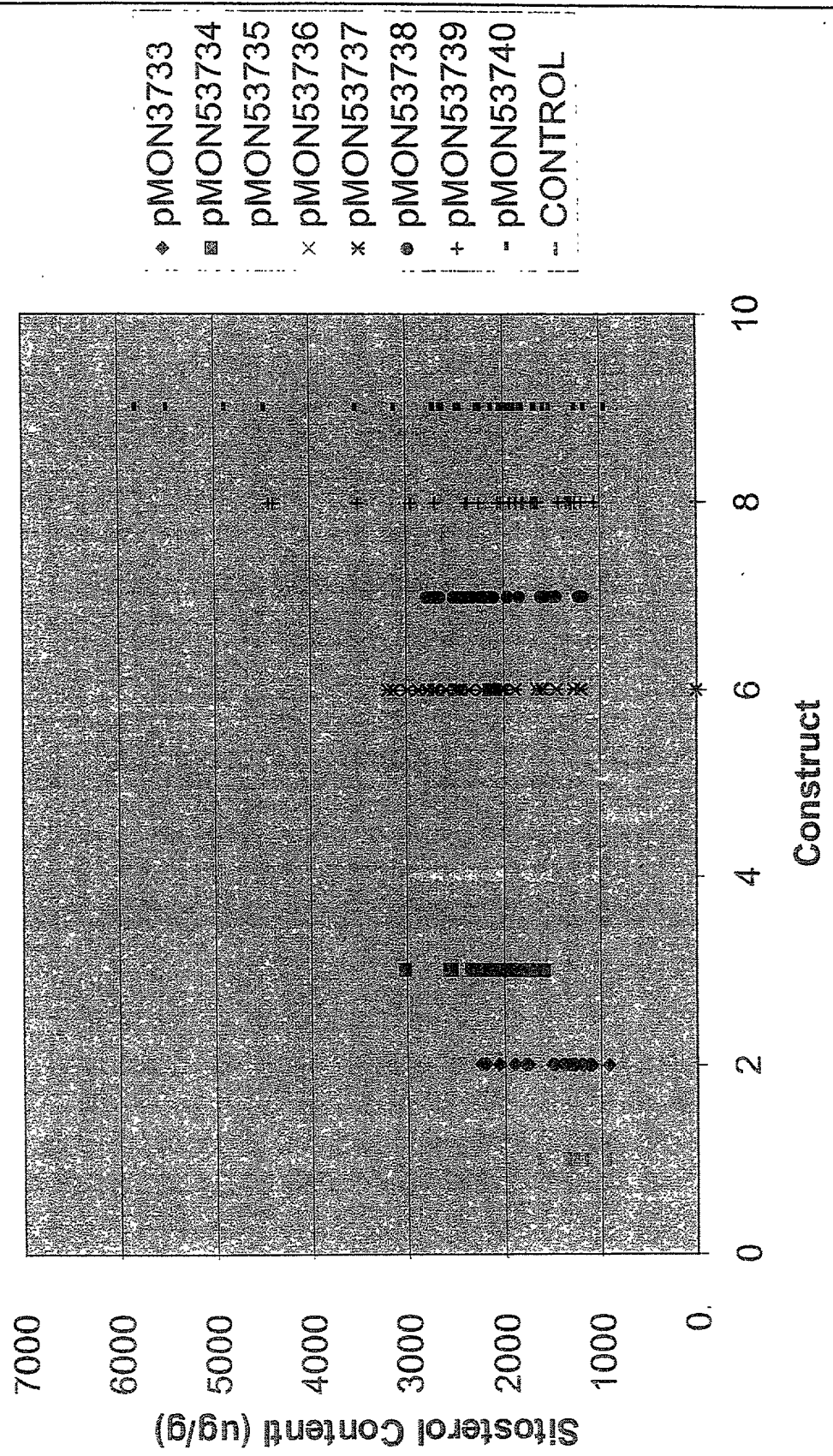


FIGURE 25

# Comparison of Sitostanol Levels in Transgenic Plants

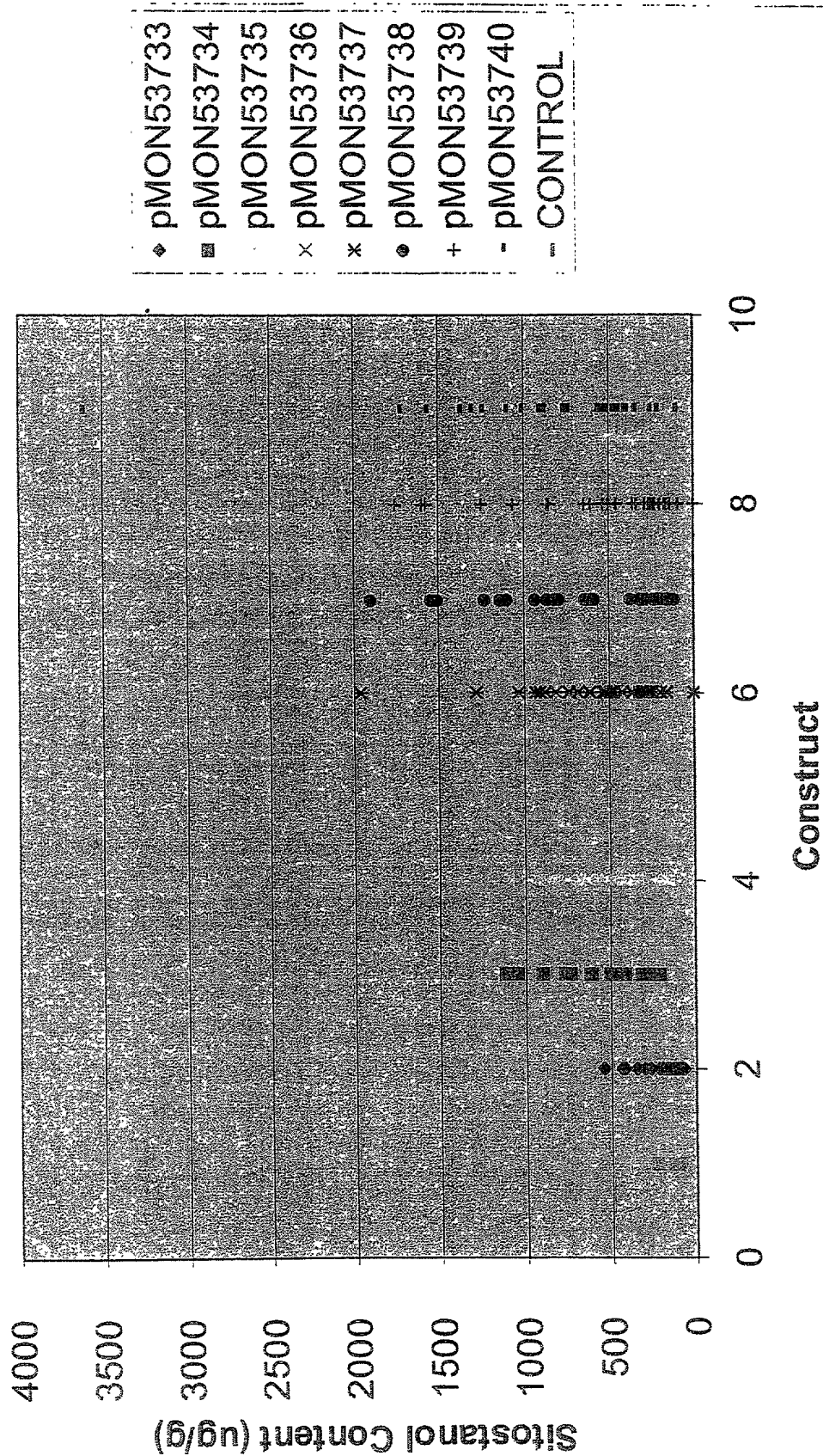
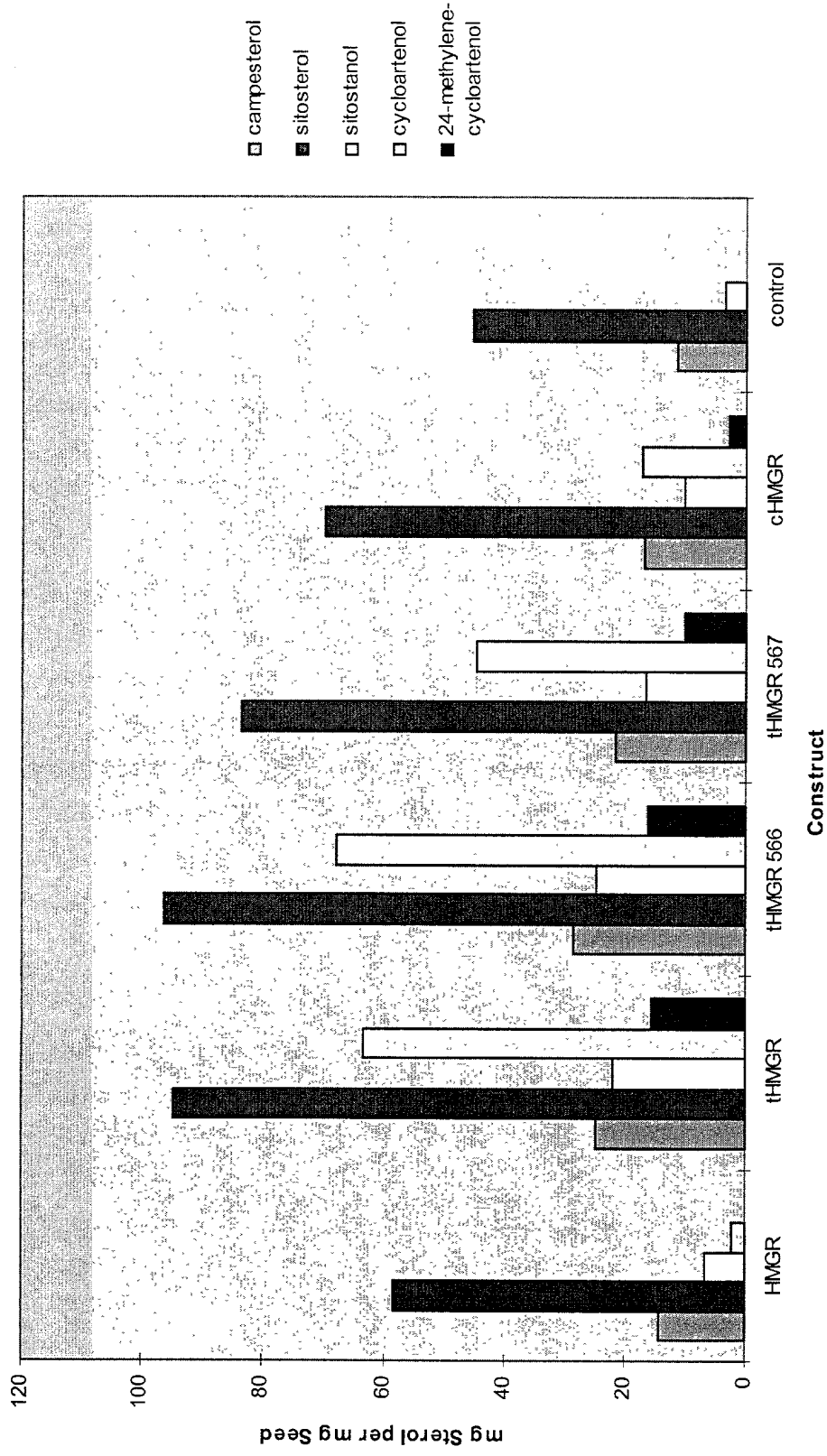


FIGURE 26

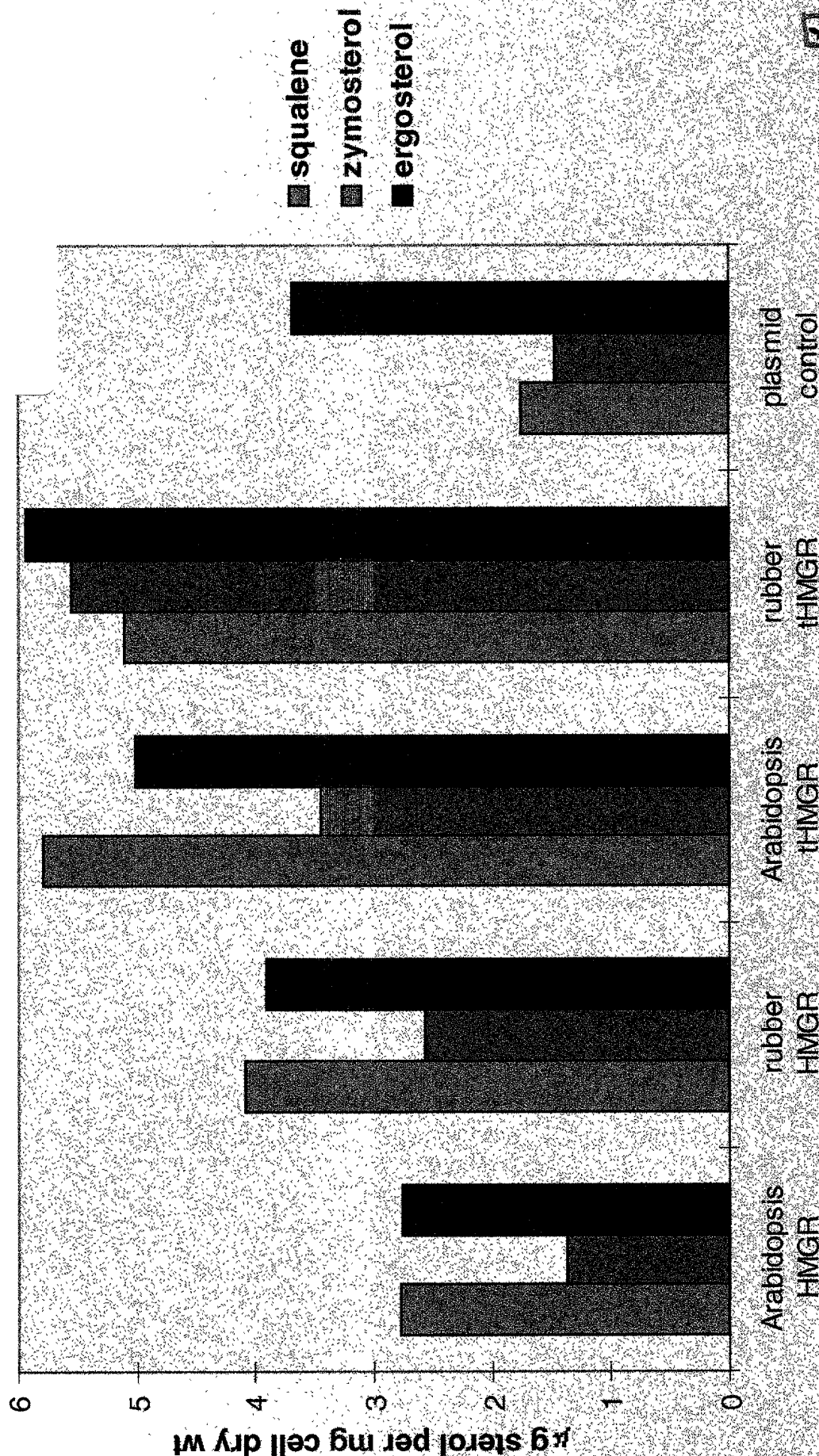


**Figure 27: Sterol profile of transgenic *Arabidopsis* harboring different forms of rubber HMGR. HMGR: rubber full length HMGR; tHMGR: catalytic domain of rubber HMGR with the linker region; tHMGR 566: catalytic domain with linker region of rubber HMGR in which the serine residue at 566 is converted to alanine; tHMGR 567: catalytic domain with linker region of rubber HMGR in which the serine residue at 567 is converted to alanine; cHMGR: catalytic domain of rubber HMGR without the linker region.**

# Plant HMGR Constructs in Yeast HMGR1

## Knockout Mutant

FIGURE 28



GREG THORNE

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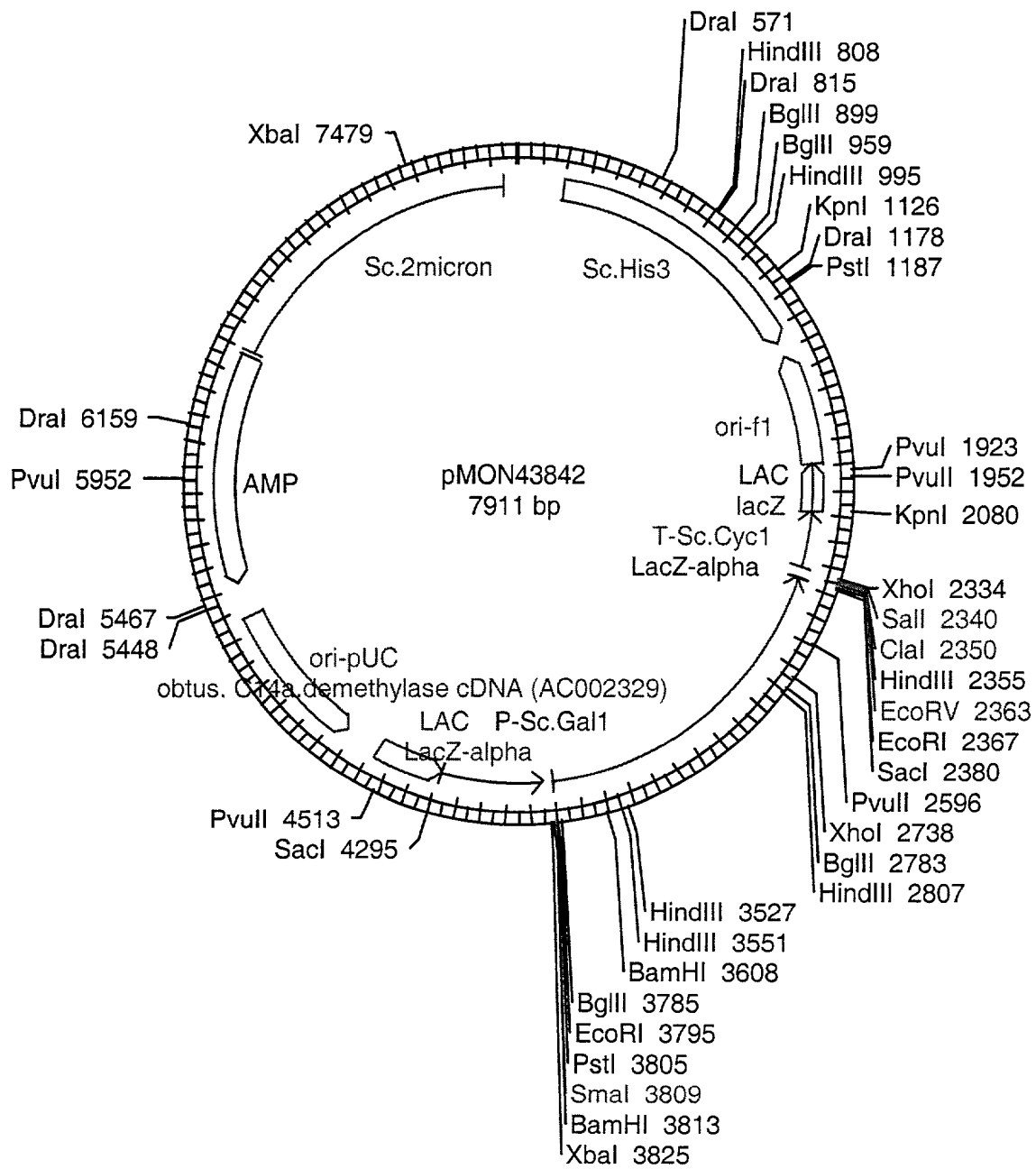


Figure 29: Construct pMON43842

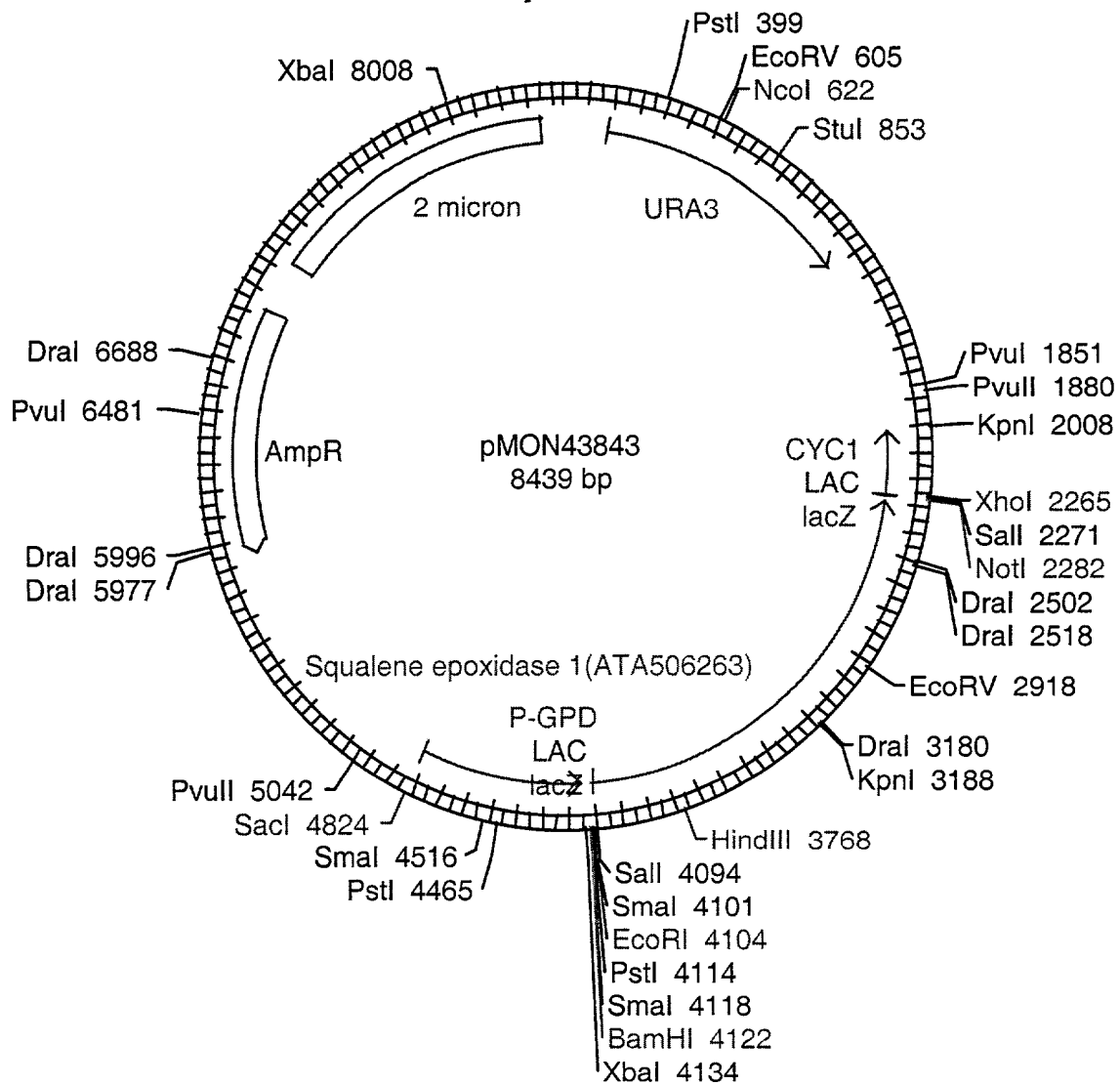


Figure 30: Construct pMON43843

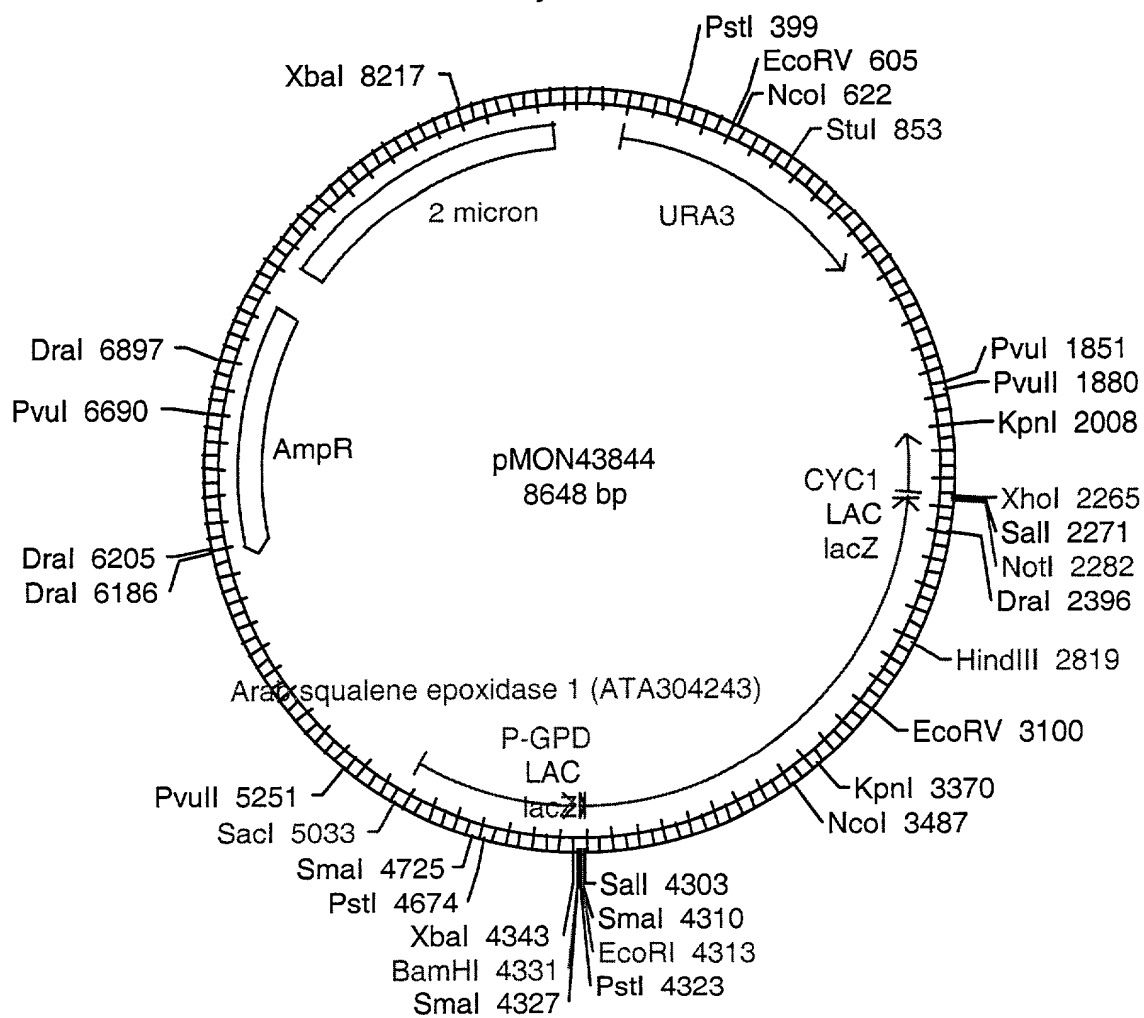


Figure 31: Construct pMON43844

Plurality: 5.00 Threshold: 4 AveWeight 1.00 AveMatch 2.91 AvMisMatch -2.00  
1

50

HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} MSLPLKTIVH LVKPFACAR FSARYPIHVI VVAVLLSAAA  
 YLSVTQSYLN  
 HMGRclustalW{ yeast1} MPPLFKGLKQ MAKPIAYVSR FSAKRPIHII LFSLIISAF  
 YLSVIQYYFN  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} .....  
 .....  
 HMGRclustalW{ candida} .....  
 .....  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} .....  
 .....  
 HMGRclustalW{ corn} .....  
 .....  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} .....  
 .....  
 HMGRclustalW{rosyperiw} .....  
 .....  
 HMGRclustalW{ tomato} .....  
 .....  
 HMGRclustalW{woodtobacc} .....  
 .....  
 HMGRclustalW{ potato} .....  
 .....  
 HMGRclustalW{radish} .....  
 .....  
 HMGRclustalW{arabadopsis1} .....  
 .....  
 HMGRclustalW{cucumismel} .....  
 .....  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} .....  
 .....  
 HMGRclustalW{camptothec} .....  
 .....  
 HMGRclustalW{arabadops2} .....  
 .....  
 HMGRclustalW{chineseham} .....  
 .....

FIGURE 32A



HMGRclustalW{chineseha2} .....  
 .....  
 HMGRclustalW{syrianhamst} .....  
 .....  
 HMGRclustalW{ rat} .....  
 .....  
 HMGRclustalW{ rabbit} .....  
 .....  
 HMGRclustalW{ human} .....  
 .....  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} .....  
 .....  
 HMGRclustalW{sea urchin} .....  
 .....  
 HMGRclustalW{ cockroach} .....  
 .....  
 HMGRclustalW{drosophila} .....  
 .....  
 HMGRclustalW{dictyostel} .....  
 .....  
 HMGRclustalW{schistosom} .....  
 .....  
 HMGRclustalW{archaeoglo} .....  
 .....  
 HMGRclustalW{pseudomonas} .....  
 .....  
 .....  
 Consensus -----

FIG. 32B

51

100  
 HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} EWKLDNS.QY STYLSIKPDE LFEKCTHYR SPVSDTWKLL  
 SSKEAADIYT  
 HMGRclustalW{ yeast1} GWQLDNSVF ETAPNKDSNT LFQEC SHYYR DSSLDGWVSI  
 TAHEASELPA  
 HMGRclustalW{phycomyc} .....  
 .....  
 HMGRclustalW{ fusarium} .....MDH EGCQGQHPQQ  
 CCQWVSNWS  
 HMGRclustalW{ candida} .....MFYH GASANQHWIA  
 VDDLKVPVD  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} .....  
 .....  
 HMGRclustalW{ corn} .....  
 .....  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} .....  
 .....  
 HMGRclustalW{rosyperiwi} .....  
 .....  
 HMGRclustalW{ tomato} .....  
 .....  
 HMGRclustalW{woodtobacc} .....  
 .....  
 HMGRclustalW{ potato} .....  
 .....  
 HMGRclustalW{radish} .....  
 .....  
 HMGRclustalW{arabadopsis1} .....  
 .....  
 HMGRclustalW{cucumismel} .....  
 .....  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertrel} .....  
 .....  
 HMGRclustalW{camptothec} .....  
 .....  
 HMGRclustalW{arabadops2} .....  
 .....  
 HMGRclustalW{chineseham} .....MLSR LFRMH  
 GLFVASHPWE  
 HMGRclustalW{chineseha2} .....MLSR LFRMH

GLFVASHPWE  
 HMGRclustalW{syrianhamst} ..... .MLSRLFRMH  
 GLFVASHPWE  
 HMGRclustalW{ rat} ..... .MLSRLFRMH  
 GLFVASHPWE  
 HMGRclustalW{ rabbit} ..... .MLSRLFRMH  
 GLFVASHPWE  
 HMGRclustalW{ human} ..... .MLSRLFRMH  
 GLFVASHPWE  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} ..... .MLSRLFRMH  
 GQFVASHPWE  
 HMGRclustalW{sea urchin} ..... .MLSRLFLAQ  
 GRFCSSHPWE  
 HMGRclustalW{ cockroach} ..... .MVGRLFRAH  
 GQFCASHPWE  
 HMGRclustalW{drosophila} ..... .MIGPLFRAT  
 .QFCASHPWE  
 HMGRclustalW{dictyostel} .....  
 .....  
 HMGRclustalW{schistosom} .....  
 .....  
 HMGRclustalW{archaeoglo} .....  
 .....  
 HMGRclustalW{pseudomonas} .....  
 .....  
 Consensus ----- -MLSRLFRMH  
 GLFVASHPWE

FIG. 32D

150

5

```

HMGRclustalW{chineseha2} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{syrianhamst} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{      rat} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{      rabbit} VIVGTVT..L TICMMSMN.. MFTGNDK... ..
.....
HMGRclustalW{      human} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{      mouse} .....
.....
HMGRclustalW{      xenopus} VIVGTVT..L TICMMSMN.. MFTGNDK... ..
.....
HMGRclustalW{sea urchin} VIVCTLT..L TICMLSMN.. YFTGLPR... ..
.....
HMGRclustalW{cockroach} VIVATLT..L TVCMLTVDQ. RPLGLP.... ..
.....
HMGRclustalW{drosophila} VIVALLT..I TACMLNGGQE QYPGCEQRIG HSTASAAAAG
SGSGAGSGAS
HMGRclustalW{dictyostel} .....
.....
HMGRclustalW{schistosom} .....
.....
HMGRclustalW{archaeoglo} .....
.....
HMGRclustalW{pseudomonas} .....
.....
Consensus VIVGTVT--L TICMMSMN-- MFTGNNK--- -----
-----

```

FIG 32F

151

200

```

HMGRclustalW{methanobac} .....
.....
HMGRclustalW{methanococ} .....
.....
HMGRclustalW{halobacter} .....
.....
HMGRclustalW{sulfolobus} .....
.....
HMGRclustalW{      yeast2} NGTKWRLRNN SNFILDHNI YRNMVKQFSN KTSEFDQFDL
FIILAAYLTL
HMGRclustalW{      yeast1} DGTKWRLRSD RKSLFDVKTl AYSLYDVFSE NVTQADPFDV
LIMVTAYLMM
HMGRclustalW{phycomyces} .....
.....
HMGRclustalW{  fusarium} SSVFAFLFGL VVTTKLGVPi SVILLSEGLP FLVVTIGFEK
NIVLTRAVMS
HMGRclustalW{  candida} DGTWVRSRAY HGKLGKYSdM AVGAFNKVLN LVRGAETFDI
ALVTCAYIAM
HMGRclustalW{dictyoste2} .....
.....
HMGRclustalW{wheat1} .....
.....
HMGRclustalW{      rice} .....
.....
HMGRclustalW{  corn} .....
.....
HMGRclustalW{wheat3} .....
.....
HMGRclustalW{wheat2} .....
.....
HMGRclustalW{      soybean} .....
.....
HMGRclustalW{rubbertre3} .....
.....
HMGRclustalW{rosyperiwi} .....
.....
HMGRclustalW{      tomato} .....
.....
HMGRclustalW{woodtobacc} .....
.....
HMGRclustalW{      potato} .....
.....
HMGRclustalW{radish} .....
.....
HMGRclustalW{arabadopsis1} .....
.....
HMGRclustalW{cucumismel} .....
.....
HMGRclustalW{rubbertre2} .....
.....
HMGRclustalW{rubbertre1} .....
.....
HMGRclustalW{camptothec} .....
.....
HMGRclustalW{arabadops2} .....
.....
HMGRclustalW{chineseham} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA

```

```

      HMGRclustalW{chineseha2} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{syrianhamst} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      rat} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      rabbit} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      human} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      mouse} .....
.....
      HMGRclustalW{      xenopus} .....I CGWNYAC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{sea urchin} .....I CGWNYECAPO VKESSLSSDV
LVMCIMRTLA
      HMGRclustalW{cockroach} ..... PGWGHNC..I TLEEYNAADM
IVMTLIRCVA
      HMGRclustalW{drosophila} GTIPPSSMGG SATSSRHRPC HGWSQSC.DG LEAEYNAADV
ILMTIVRCTA
      HMGRclustalW{dictyostel} .....
.....
      HMGRclustalW{schistosom} .....M LKILNTVLLF FDCFSTGTFF
VLLIYLFTRL
      HMGRclustalW{archaeoglo} .....
.....
      HMGRclustalW{pseudomonas} .....
.....

Consensus -----I CGWNYEC-PK FEEDVLSSDI
IILTITRCIA

```

FIG.32 H

250

9



```

HMGRclustalW{chineseha2} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{syrianhamst} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      rat} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      rabbit} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      human} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      mouse} .....
.....
HMGRclustalW{      xenopus} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{sea urchin} VAYLYLQFTK LRTTGSKYIL GIAGLFTIFS SFLFSSAVIH
.....
HMGRclustalW{cockroach} VLYSYYQFCH LQKLGSKYIL GIAGLFTVFS SFVFSSSVIN
.....
HMGRclustalW{drosophila} VLYCYQFCS LHRLGSKYVL GIAGLFTVFS SFIFTTAAIK
.....
HMGRclustalW{dictyostel} .....
.....
HMGRclustalW{schistosom} RTHLLHFSSS NCHLDVIIYQ SRAVIIFLVV FVYFIGVLTC
KINDKILVHT
HMGRclustalW{archaeoglo} .....
.....
HMGRclustalW{pseudomonas} .....
.....

Consensus ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH -----

```

FIG. 325

300

11

|                           |            |             |            |                       |
|---------------------------|------------|-------------|------------|-----------------------|
| HMGRclustalW{chineseha2}  | FLDKELTGLN | EALPFFLLLI  | DLSRASALAK | FALSSNSQDE            |
| VRENIARGMA                |            |             |            |                       |
| HMGRclustalW{syrianhamst} | FLDKELTGLN | EALPFFLLLI  | DLSRASALAK | FALSSNSQDE            |
| VRENIARGMA                |            |             |            |                       |
| HMGRclustalW{rat}         | FLDKELTGLN | EALPFFLLLI  | DLSRASALAK | FALSSNSQDE            |
| VRENIARGMA                |            |             |            |                       |
| HMGRclustalW{rabbit}      | FLDKELTGLN | EALPFFLLLI  | DLSRASALAK | FALSSNSQDE            |
| VRENIARGMA                |            |             |            |                       |
| HMGRclustalW{human}       | FLDKELTGLN | EALPFFLLLI  | DLSRASTLAK | FALSSNSQDE            |
| VRENIARGMA                |            |             |            |                       |
| HMGRclustalW{mouse}       | .....      | .....       | .....      | .....                 |
| .....                     |            |             |            |                       |
| HMGRclustalW{xenopus}     | FLDKELTGLN | EALPFFLLLI  | DLSKASALAK | FALSSNSQDE            |
| VRDNIARGMA                |            |             |            |                       |
| HMGRclustalW{sea urchin}  | LFGLELTGLN | EALPFFLLLI  | DLTKASALTK | FALSSSTQNE            |
| VVDNIARGMA                |            |             |            |                       |
| HMGRclustalW{cockroach}   | FLGSDVSDLK | DALFFFLLLI  | DLSKATVLAQ | FALSSRSQDE            |
| VKHNIARGIA                |            |             |            |                       |
| HMGRclustalW{drosophila}  | FLGSDISELK | DALFFLLLLVI | DLSNSGRLRS | GAMGSN.QAE            |
| VTQNIARGLE                |            |             |            |                       |
| HMGRclustalW{dictyostel}  | .....      | .....       | .....      | .....                 |
| .....                     |            |             |            |                       |
| HMGRclustalW{schistosom}  | MLRNKRQLNT | LFYTLILFTF  | ALCSLSSVLF | VPYTSFAIFL            |
| LSTSVFLLFS                |            |             |            |                       |
| HMGRclustalW{archaeoglo}  | .....      | .....       | .....      | .....                 |
| .....                     |            |             |            |                       |
| HMGRclustalW{pseudomonas} | .....      | .....       | .....      | .....                 |
| .....                     |            |             |            |                       |
|                           | Consensus  | FLDKELTGLN  | EALPFFLLL- | DL-RASALAK FALSSNSQDE |
| VRENIARGMA                |            |             |            |                       |

FIG. 32L

301

350  
 HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} QEGAYLIRDY LFYISSFIGC AIYARHLPGL VNFCILSTFM  
 LVFDLLLSAT  
 HMGRclustalW{ yeast1} EEGGRLIQDH LLCIFAFIGC SMYAHQLKTL TNFCILSAFI  
 LIFELILTPT  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} VSSVMSICVW PLRMMASRRV AENVAKGDDE LNRVRGDAPL  
 FGRKSSSIPK  
 HMGRclustalW{ candida} EQGPLLLRDH LFMITAFLGC SFYASYLDGL KNFCILAALI  
 LAFDILTTST  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} ..... .MRIT.....  
 ...NGLAMVS  
 HMGRclustalW{ corn} PE....PSRA .....AA RVQAGDALPL PIRHT.....  
 ...NLIFSAL  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} .....HH L.....PP LKPSDYSLPL SLYLA.....  
 ...NALVFSL  
 HMGRclustalW{rosyperiwi} .....NQ Q.....PS IPRSSDVLPL PLYLA.....  
 ...NGVFFTL  
 HMGRclustalW{ tomato} QQ....QEDK N.....TL LIDASDALPL PLYLTT....  
 ...NGLFFTM  
 HMGRclustalW{woodtobacc} QQ....QEOD N.....SL LI.ASDALPL PLYLT.....  
 ...NGLFFTM  
 HMGRclustalW{ potato} .....VS SPKASDALPL PLYLT.....  
 ...NGLFFTM  
 HMGRclustalW{radish} DD....DDRR K.....TLTS PPKASDALPL PLYLT.....  
 ...NAVFFTL  
 HMGRclustalW{arabadosis1} SD....DDHR RR..ATTIAP PPKASDALPL PLYLT.....  
 ...NAVFFTL  
 HMGRclustalW{cucumismel} SA....ADHL KR.....A SPKASDALPL PLYLT.....  
 ...NTIFFTL  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} PV....EDRS P.....T TPKASDALPL PLYLT.....  
 ...NAVFFTL  
 HMGRclustalW{camptothec} KV....DAVD L.....PD SPKASDALPL PLYIT.....  
 ...NGVFFTL  
 HMGRclustalW{arabados2} .....VAVD .....PP LRKASDALPL PLYLT.....  
 ...NTFFLSL  
 HMGRclustalW{chineseham} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS  
 VLANYFVFMT

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      HMGRclustalW{chineseha2}  ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
VLANYFVFMT
      HMGRclustalW{syrianhamst}  ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
VLANYFVFMT
      HMGRclustalW{      rat}    ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
VLANYFVFMT
      HMGRclustalW{      rabbit}  ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
VLANYFVFMT
      HMGRclustalW{      human}   ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
VLANYFVFMT
      HMGRclustalW{      mouse}   .....
.....
      HMGRclustalW{      xenopus}  ILGPTFTLEA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
VLANYFAFMT
      HMGRclustalW{sea urchin}    ILGPTITLDT VV..TTLVIS IGTMISSIRKM EVFCCFGILS
LIANYFVFMT
      HMGRclustalW{      cockroach} MLGPTITLDT VV..ETLVIG VGMLSGVRRL EVLCCFACMS
VIVNYVVFMT
      HMGRclustalW{drosophila}    LLGPAISLDT IV..VVLLVG VGTLSGVQRL EVLCMFAVLS
VLVNYVVFMT
      HMGRclustalW{dictyostel}    .....M LFAPPNLETK ELFWIIY.IL
ILIPKVFAKV
      HMGRclustalW{schistosom}    DLSVFFIVLE YLLEIELVN YEHAQRHCLL SHLFSNQLFV
DHMLGMFLKT
      HMGRclustalW{archaeoglo}    .....
.....
      HMGRclustalW{pseudomonas}   .....
.....
                                Consensus  ILGPTFTLDA LV--ECLVIG VGTASD-LPL -LYCTFGCMS
VLANYFFFMT

```

FIG. 32N

400  
 HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} FYSAILSMKL EINIIHRSTV IRQTL..EED GVVPTTADII  
 YKDETAEPH  
 HMGRclustalW{ yeast1} FYSAILALRL EMNVIHRSTI IKQTL..EED GVPSTARI  
 SKAEKKS SVSS  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} FKVLMILGFI FVNIVNICSI PFRNP..SSM STIRTWASSL  
 GGVIAPLSVD  
 HMGRclustalW{ candida} FLSAILSLKL EINQIHRSTL LREQ..EDD GLTETTVDDV  
 LKSNSLAGTK  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} LVLSSCDLVR LCSDRER... PL..... GGREFA  
 TVVCQLASVV  
 HMGRclustalW{ corn} FAASLAYLMR RWREKIRSST PLHA..... VGLAEML  
 AIFGLVASLI  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} FFSVAYFLLH RWREKIRKST PLHI..... VTFPEIA  
 ALICLVASVI  
 HMGRclustalW{rosyperiw} FFSVMYFLLT RWREKIRNAT PLHV..... VTLSELA  
 ALASLIASVI  
 HMGRclustalW{ tomato} FFSVMYFLLS RWREKIRNST PLHV..... VTLSELG  
 AIVSLIASVI  
 HMGRclustalW{woodtobacc} FFSVMYLLS RWREKIRNST PLHV..... VTFSELV  
 AIASLIASVI  
 HMGRclustalW{ potato} FFSVMYFLLV RWREKIRNSI PLHV..... VTLSELL  
 AMVSLIASVI  
 HMGRclustalW{radish} FFSVAYYLLH RWRDKIRYNT PLHV..... VTVTELG  
 AIVALIASFI  
 HMGRclustalW{arabadopsis1} FFSVAYYLLH RWRDKIRYNT PLHV..... VTITELG  
 AIIALIASFI  
 HMGRclustalW{cucumismel} FFSVAYYLLH RWRDKIRNST PLHV..... VTLSEIA  
 AIVSLMASFI  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertrel} FFSVAYYLLH RWRDKIRNST PLHI..... VTLSEIV  
 AIVSLIASFI  
 HMGRclustalW{camptothec} FFTVYVYLLV RWREKIRNST PLHV..... VTLSEIA  
 AIFTFVASFI  
 HMGRclustalW{arabadops2} FFATVYFLLS RWREKIRNST PLHV..... VDLSEIC  
 ALIGFVASFI  
 HMGRclustalW{chineseham} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEE.  
 NKPNPVTQRV

HMGRclustalW{chineseha2} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.  
 NKPNPVTQRV  
 HMGRclustalW{syrianhamst} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.  
 NKPNPVTQRV  
 HMGRclustalW{ rat} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.  
 NKPNPVTQRV  
 HMGRclustalW{ rabbit} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.  
 NKPNPVTQRV  
 HMGRclustalW{ human} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.  
 NKPNPVTQRV  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} FFPACVSLVL ELSRESREGR PIWQ...LSQ FASVLEEEED  
 NKPNPVTQRV  
 HMGRclustalW{sea urchin} FFPACLSLVL ELSNSNKYGR PVWH...LGR FAEVLEEEED  
 RKPVPVQRV  
 HMGRclustalW{ cockroach} FYPACLSLIL ELSRSGESGR PAWHD..KSL IIKALHEED.  
 QKPNPVPVQRV  
 HMGRclustalW{drosophila} FYPACLSLIF DLSRSGVDMS VVREKAKGSL PLKSLTEEE.  
 QKANPVLQRV  
 HMGRclustalW{dictyostel} MSVRELFPPF KWGFNIRRSN FLVP..... ...ILSNNVI  
 VTGEEAVQYE  
 HMGRclustalW{schistosom} SLFSISTTSK YAYLESIFKC TLMEQIIYIM IVFVFLPSFM  
 RIFASYAKRM  
 HMGRclustalW{archaeoglo} .....  
 .....  
 HMGRclustalW{pseudomonas} .....  
 .....  
 Consensus FFSACYSLLL -WRRKIRNST PLHV---LSH FARVTLEEEA AKPN-  
 VASRI

FIG. 32P

401

450  
 HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} FLRSNVAILL GKASVIGLLL LINLYVF... .TDKLNATIL  
 NTVYFDSTIY  
 HMGRclustalW{ yeast1} FLNLSVVVII MKLSVILLFV FINFYNF... GANWVN.DAF  
 NSLYFDKERV  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} PFKVASNGLD AILPTAKSNN RPTLVTV... LTPIKYELEY  
 PSIHIALGSA  
 HMGRclustalW{ candida} TFTDAPSTLV TVAKVAGVSV FFGLHIFY... GFSAWLSDL  
 SAGNETNDTF  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} YLLSLFAHPD APATTTGDDD .....  
 .....  
 HMGRclustalW{ corn} YLLSFFGIAF VQSIVSSGDD .....  
 .....  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} YLLGFFGIGF VHSFS.RAST .....  
 .....  
 HMGRclustalW{rosyperiwi} YLVSFFGLDF VQSLIYKPNN .....  
 .....  
 HMGRclustalW{ tomato} YLLGFFGIGF VQTFVSRGNN .....  
 .....  
 HMGRclustalW{woodtobacc} YLLGFFGIGF VQSFVSRDNN .....  
 .....  
 HMGRclustalW{ potato} YLLGFFGIGF VQSFVSRSNS .....  
 .....  
 HMGRclustalW{radish} YLLGFFGIDF VQSFISRP.. .....  
 .....  
 HMGRclustalW{arabadopsis1} YLLGFFGIDF VQSFISRASG .....  
 .....  
 HMGRclustalW{cucumismel} YLLGFFGIDF VQSFARSSP .....  
 .....  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} YLLGFFGIDF VQSFARASH .....  
 .....  
 HMGRclustalW{camptothec} YLLGFFGIGL VQPFTSRSSH .....  
 .....  
 HMGRclustalW{arabadops2} YLLGFCGIDL IFRSS..SD. ....  
 .....  
 HMGRclustalW{chineseham} KMIMSLGLVL VHAHSRWIAD PSPQNST... TE.HSKVSLG  
 LDEDVSKRIE

FIG. 32Q



HMGRclustalW{chineseha2} KMIMSLGLVL VHAHSRWIAD PSPQNST... TE.HSKVSLG  
 LDEDVSKRIE  
 HMGRclustalW{syrianhamst} KMIMSLGLVL VHAHSRWIAD PSPQNST... TE.HSKVSLG  
 LDEDVSKRIE  
 HMGRclustalW{ rat} KMIMSLGLVL VHAHSRWIAD PSPQNST... AE.QSKVSLG  
 LAEDVSKRIE  
 HMGRclustalW{ rabbit} KMIMSLGLVL VHAHSRWIAD PSPQNST... AD.NSKVSLG  
 LDENVSKRIE  
 HMGRclustalW{ human} KMIMSLGLVL VHAHSRWIAD PSPQNST... AD.TSKVSLG  
 LDENVSKRIE  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} KMIMSLGLVL VHAHSRWIAD PSSQNST... SISDHEVTM  
 LDDMMPKRVE  
 HMGRclustalW{sea urchin} KMIMRTGLVL VHAHSRWLAS ....NDT... ELMSRDMLYD  
 GNLLTDKKID  
 HMGRclustalW{ cockroach} KVIMSAGLML VHAH.RWVRC .....L.  
 .....  
 HMGRclustalW{drosophila} KLIMTTGLMA VHIYSREVSP ....AAT... TMVDKTLTPT  
 LSLNVSNRT  
 HMGRclustalW{dictyostel} KPLPYIPQHN QQQQQKQQPS .....  
 .....  
 HMGRclustalW{schistosom} YGEQKKCLVS NKGVSSTRK RRHSYSSGHS YVEYRRMSVH  
 NLIGYVNP  
 HMGRclustalW{archaeoglo} .....  
 .....  
 HMGRclustalW{pseudomonas} .....  
 .....  
 Consensus YLL-FFG-VL V-A-SR-ISD PSPQNST--- ----SKVSLG LDE-  
 VSKRIE

FIG. 32R

451

500

HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} SLPNFINYKD IGNLSNQVII SVLPKQYYTP LKKYHQIEDS  
 VLLIIDSVS  
 HMGRclustalW{ yeast1} SLPDFITSNA SENFKEQAIV SVTPLLYYKP IKSYQRIEDM  
 VLLLLLRNVSV  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} ASNPAYN.DA FHHHFQGYGV GGRMVGGILK SLEDPVLSKW  
 IVIALALSVA  
 HMGRclustalW{ candida} TLYDAVA.DQ IPIGSNGTLV TLFPTRFPLP EKLSTQIEAV  
 VLSFIGLIST  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} ..D.....  
 .....  
 HMGRclustalW{ corn} ..DEDFLVGS G.....  
 .....  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} ..D.SWDVEE Y.....D DDNIIIKEDT  
 R.....  
 HMGRclustalW{rosyperiwi} ..E.GWEIEE .....EILMVEDS  
 RN.....  
 HMGRclustalW{ tomato} ..D.SWDE.. .....N DEEFLLKEDS  
 RC.....  
 HMGRclustalW{woodtobacc} ..DECWDEED E.....N DEQFLLEEDS  
 RR.....  
 HMGRclustalW{ potato} ..D.SWDIED E.....N AEQLIIEEDS  
 RR.....  
 HMGRclustalW{radish} ..D.SGDSER .....DFDDH  
 R.....  
 HMGRclustalW{arabadopsis1} ..D.AWDLAD T.....I .....DDDDH  
 R.....  
 HMGRclustalW{cucumismel} ..D.AWDLAD .....EIDRT  
 L.....  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} ..D.VWDLED T.....D P.NYLIDEDH  
 R.....  
 HMGRclustalW{camptothec} ..DDVWGVDD DE.....D VDEIVLKEDT  
 R.....  
 HMGRclustalW{arabadops2} ..DDVWVNDG .....  
 .....  
 HMGRclustalW{chineseham} PSVSLWQFYL SKMISMDIEQ VVTLSLAFLL AVKYIFFEQA  
 ET..ESTLSL

```

HMGRclustalW{chineseha2} PSVSLWQFYL SKMISMDIEQ VVTLSLAFL L AVKYIFFEQA
ET..ESTLSL
HMGRclustalW{syrianhamst} PSVSLWQFYL SKMISMDIEQ VVTLSLAFL L AVKYIFFEQA
ET..ESTLSL
HMGRclustalW{      rat} PSVSLWQFYL SKMISMDIEQ VITLSLALL L AVKYIFFEQA
ET..ESTLSL
HMGRclustalW{      rabbit} PSVSLWQFYL SKMISMDIEQ VITLSLALL L AVKYIFFEQA
ET..ESTLSL
HMGRclustalW{      human} PSVSLWQFYL SKMISMDIEQ VITLSLALL L AVKYIFFEQT
ET..ESTLSL
HMGRclustalW{      mouse} .....
.....
HMGRclustalW{      xenopus} PSMPLWQFYL SRMVTMDVEQ IITLGLALL L AVKYIFFEQT
ET..ESTFSM
HMGRclustalW{sea urchin} PTMPLWEFYA TRLWPPTLDY ILTAILATV L ASHYIFFSDL
ATYPEKRVSI
HMGRclustalW{      cockroach} .SIALWPDLT S.....LRY FCTHCDTGVS YSRWSFASEG
EE..LPTVKL
HMGRclustalW{drosophila} ESGEIADIII KWL.T.MSADH IVISIVLIAL VVKFICFDNR
DP...LPDQL
HMGRclustalW{dictyostel} ..QDYIQQPQ ..... ..N....DNN
IN.....
HMGRclustalW{schistosom} CHYKCWSTTF VIFVSLIILH LNNRYSERIS SFKHNSSENE
VFPVLYHITA
HMGRclustalW{archaeoglo} .....
.....
HMGRclustalW{pseudomonas} .....
.....

Consensus PSDSLWDFY- SKMISMDIEQ VVTLSLA-LL AVKYIFFED- RT--
ESTLSL

```

FIG. 32T

501

550  
 HMGRclustalW{methanobac} .....  
 .....  
 HMGRclustalW{methanococ} .....  
 .....  
 HMGRclustalW{halobacter} .....  
 .....  
 HMGRclustalW{sulfolobus} .....  
 .....  
 HMGRclustalW{ yeast2} AIRDQFISKL LFFAFAVSIS INVYLLNAAK IHTGYMNFQ.  
 ..PQSNKIDD  
 HMGRclustalW{ yeast1} AIRDRFVSKL VLSALVCSAV INVYLLNAAR IHTSYTADQL  
 VKTEVTKKSF  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} LNGYLFNVAR WGIKDPNVPE HNIDRNELAR AREFNDTGS.  
 .....AT  
 HMGRclustalW{ candida} AARDKYISKF ILFAFAVSAS INVYLLNVAR IHTTRLEDA.  
 .....IE  
 HMGRclustalW{dictyoste2} .....  
 .....  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} .....  
 .....  
 HMGRclustalW{ corn} .....  
 .....  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} .....  
 .....  
 HMGRclustalW{rosyperiwi} .....G.....  
 .....  
 HMGRclustalW{ tomato} .....G.....  
 .....  
 HMGRclustalW{woodtobacc} .....G.....  
 .....  
 HMGRclustalW{ potato} .....G.....  
 .....  
 HMGRclustalW{radish} .....  
 .....  
 HMGRclustalW{arabadopsis1} .....  
 .....  
 HMGRclustalW{cucumismel} .....  
 .....  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertrel} .....  
 .....  
 HMGRclustalW{camptothec} .....  
 .....  
 HMGRclustalW{arabadops2} .....  
 .....  
 HMGRclustalW{chineseham} KN..PITSPV VTPKKAPDNC CRREPLLVR R SEKLSSVEEE  
 PGVSQDRKVE

T00250" C2/58860

SQDRKVE

600

23

HMGRclustalW{chineseha2} VIKPLVVETE SAS..... .RATFVLG.A .SGTSPPVAA  
 RTQELEIELP  
 HMGRclustalW{syrianhamst} VIKPLVAETE STS..... .RATFVLG.A .SGGCSPPVAL  
 GTQEPEIELP  
 HMGRclustalW{ rat} VIKPLVAEAE TSG..... .RATFVLG.A .SAASPPLAL  
 GAQEPGIELP  
 HMGRclustalW{ rabbit} VIKPLVAETD SPH..... .RAAFVVGGS .SFPDTSVL  
 ETKEPEIELP  
 HMGRclustalW{ human} VIKPLVAETD TPN..... .RATFVVGNS .SLLDTSVL  
 VTQEPEIELP  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} VIKPLPLETS P..... .KAKFIVG.. .DSSPLELSP  
 EDKNTMFDLP  
 HMGRclustalW{sea urchin} PVTASPRNSR SSSPVSSHVS KPARFTIGSS GSGSEDEEEE  
 VIKKEEVEWV  
 HMGRclustalW{ cockroach} ETRDELTTTR GMDG.....W VEVSSPVEHK YVQTEQPSCS  
 APEQPLEEPP  
 HMGRclustalW{drosophila} LFTIEDQSSA N..... ..ASTQTDLL  
 PLRHRLVGPI  
 HMGRclustalW{dictyostel} .....SGKEQ EQ..... ..QQQQQQQQ  
 QQTPDITNQP  
 HMGRclustalW{schistosom} PKIKETLISD QVKQSPVLPK FSKKLNDIPL QSRKRIYCLH  
 KDDDYIDRND  
 HMGRclustalW{archaeoglo} .....  
 .....  
 HMGRclustalW{pseudomonas} .....  
 .....  
 Consensus VIKPLVAETE --S----- -RATFV-G-A -SA-PPPPA- -I-  
 PPEIELP

FIG. 32X

601

650  
 HMGRclustalW{methanobac} .....MS.  
 ...IMDDLME  
 HMGRclustalW{methanococ} .....MEN  
 YNDILEKMLN  
 HMGRclustalW{halobacter} .....MTD  
 AASLADRVRE  
 HMGRclustalW{sulfolobus} .....MK.  
 IDEVVEKLVK  
 HMGRclustalW{ yeast2} NNE.CVYALS SQDEPIRP.L SNLVELME.. ..KEQLKNMN  
 NTEVSNLVVN  
 HMGRclustalW{ yeast1} SEEDDSRDIE SLDKKIRP.L EELEALLS.. ..SGNTKQLK  
 NKEVAALVIH  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} ANL..... .PNRS.N EELEKLLS.. ..ENALREMT  
 DEEVISLSMR  
 HMGRclustalW{ candida} SEQ..... .SSRP.L EQVIELYK.. ..DGKVKTLV  
 DDEVVSLVTA  
 HMGRclustalW{dictyoste2} PNN..... .F QRAVHIRR.. ..KLLARDLQ  
 KEHQRALHAQ  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} G..... .GGMMEGD  
 DEEIVAAVAS  
 HMGRclustalW{ corn} AA..... .A.. ..PEKMPED  
 DEEIVASVVA  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} .....I VSTTT..... .TSTLSDD  
 DEQIIKSVVS  
 HMGRclustalW{rosyperiwii} SK..... .MV.I IEKPAPLI.. ..TPQNSEE  
 DEDIIKAVVA  
 HMGRclustalW{ tomato} S..... .MS.M VEKPAPLI.. ..TSASSGE  
 DEEIIKSVVQ  
 HMGRclustalW{woodtobacc} SKV..... .AA.M SEKPAPLV.. ..TPAASEE  
 DEEIIKSVVQ  
 HMGRclustalW{ potato} AKV..... .ALS.Q TEKPSPII.. ..MPALSED  
 DEEIIQSVVQ  
 HMGRclustalW{radish} E..... .QPPLPKE  
 DEEIVKSVLD  
 HMGRclustalW{arabadopsis1} EP..... .IV.. ..TESLPPEE  
 DEEIVKSVLD  
 HMGRclustalW{cucumismel} EA..... .LN.. ..TIPLPEE  
 DEEVVKMVVD  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} EP..... .LI.. ..APLVSEE  
 DEMIVNSVVD  
 HMGRclustalW{camptothec} P..... .I.. ..SPPSSEE  
 DEEIIKSVVE  
 HMGRclustalW{arabadops2} RE..... .SELDVE  
 DEEIVKLVID  
 HMGRclustalW{chineseham} SE..... .PRP.N EECLQILE.. SAEKGAKFLS  
 DAEIIQLVNA

FIG. 32Y



```

  HMGRclustalW{chineseha2} SE..... PRP.N EECLQILE.. SAEKGAKFLS
DAEIIQLVNA
  HMGRclustalW{syrianhamst} SE..... PRP.N EECLQILE.. SAEKGAKFLS
DAEIIQLVNA
  HMGRclustalW{      rat} SE..... PRP.N EECLQILE.. SAEKGAKFLS
DAEIIQLVNA
  HMGRclustalW{      rabbit} KE..... PRP.N EECLQILG.. NAEKGAKFLS
DAEIIQLVNA
  HMGRclustalW{      human} RE..... PRP.N EECLQILG.. NAEKGAKFLS
DAEIIQLVNA
  HMGRclustalW{      mouse} .....
.....
  HMGRclustalW{      xenopus} EE..... PRP.L DECVRILK.. NPDKGAQYLT
DAEIVISLVNA
  HMGRclustalW{sea urchin} LET..... ELKAPRP.M PELLEIL... NVGKGPNALT
DDEVQLLVGA
  HMGRclustalW{cockroach} AS..... NRS.I DECLSVC... KSDVGAQALS
DCEVMALVTS
  HMGRclustalW{drosophila} KP..... PRP.V QECLDILNST EEGSGPAALS
DEEIVSIVHA
  HMGRclustalW{dictyostel} TKTN..... .KKIPIKELS
NEEILIKLEK
  HMGRclustalW{schistosom} SSSVSTFSNT CKNSNERPSN VLDLDMLTEK IKQGLGHELS
DTEILQLLSH
  HMGRclustalW{archaeoglo} .....
.MQVLRLLDRR
  HMGRclustalW{pseudomonas} .....
.....

Consensus SE-----PRP-N EECLQIL--- -AEKGAKSLS
DEEIIKLVVA

```

T00330 "E33330"

FIG. 322

651

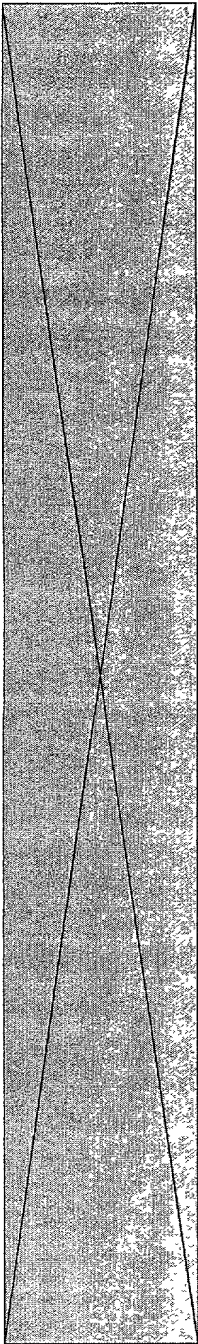
700

HMGRclustalW{methanobac} GR..IKLYEI E.RHVPVDEA VRIRREFIE. ....RTCGVK  
 ..LEHVSNY  
 HMGRclustalW{methanococ} GE..IKPYQL D.KMFGSKIA TEIRRKFIG. ....KKVGIE  
 ..FKHICNYS  
 HMGRclustalW{halobacter} GD..LRLHEL E.AHADADTA AEARRLLVE. ....SQSGAS  
 ..LDAVGNYS  
 HMGRclustalW{sulfolobus} GE..ISFHEV D.NLLEANAA MVARRLALE. ....KIVGVG  
 ..LPSIGSTV  
 HMGRclustalW{ yeast2} G..KLPLYSL EKKLEDTTTRA VLVRRKALST LAESPILVS.  
 ...EKLPPFRN  
 HMGRclustalW{ yeast1} G..KLPLYAL EKKLGDTTTRA VAVRRKALSI LAEAPVLAS.  
 ...DRLPYKN  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} G..KIPGYAL EKTLDGDFTRA VKIRRSIIAR NKAAADITHS  
 LDRSKLPYEN  
 HMGRclustalW{ candida} G..KLPLYAL EKQLGDNLRA VAIRRKALSD LADAPVLRS.  
 ...NKLPYLH  
 HMGRclustalW{dictyoste2} A..VVAIAEK AATSGEDPSS IQPVVPPTSN LDFEGSLTN.  
 .....LPVDH  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} G..ALPSHRL ESRLGDCRRA ARLRREALR. ....RVTGRG  
 ..VEGLPFDG  
 HMGRclustalW{ corn} G..KVPSYAL EARLGDCRRA AGIRREALR. ....RITGRD  
 ..IEGLPLDG  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} G..SIPSYSL ESKLGNCKRA ALIRRETLQ. ....RMSGRS  
 ..LEGLPLDG  
 HMGRclustalW{rosyperiwi} G..KIPSYSL ESKLGDCKRA AGIRREALQ. ....RITGKS  
 ..LEGLPLEG  
 HMGRclustalW{ tomato} G..KIPSYSL ESKLGDCKRA ASIRKEVMQ. ....RITGKS  
 ..LEGLPLEG  
 HMGRclustalW{woodtobacc} G..KMPSYSL ESKLGDCKRA ASIRKEALQ. ....RITGKS  
 ..LEGLPLEG  
 HMGRclustalW{ potato} G..KTPSYSL ESKLGDCKRA ASIRKEALQ. ....RITGKS  
 ..LEGLPLEG  
 HMGRclustalW{radish} G..VVPYSL ESRLGDCKRA ASIRREALQ. ....RLTGRS  
 ..IEGLPLDG  
 HMGRclustalW{arabadosis1} G..VIPSYSL ESRLGDCKRA ASIRREALQ. ....RVTGRS  
 ..IEGLPLDG  
 HMGRclustalW{cucumismel} G..SVPSYSL ESKLGDCKRA ASIRREALQ. ....RTTGRS  
 ..IHGLPFEG  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} G..KIPSYSL ESKLGDCKRA AAIRREALQ. ....RMTRRS  
 ..LEGLPVEG  
 HMGRclustalW{camptothec} G..TTPSYAL ESKLGDCKRA AAIRREALQ. ....RMTKKS  
 ..LAGLPLDG  
 HMGRclustalW{arabados2} G..TIPSYSL ETKLGDCKRA AAIRREAVQ. ....RITGKS  
 ..LTGLPLEG  
 HMGRclustalW{chineseham} K..HIPAYKL ETLMETHERG VSIRRQLLST K..LPEPSS.  
 ..LQYLPYRD

T00330" E2458850

HMGRclustalW{chinese2} K..HIPAYKL ETLMETHERG VSIRRQLLST K..LPEPSS.  
 ..LQYLPYRD  
 HMGRclustalW{syrianhamst} K..HIPAYKL ETLMETHERG VSIRRQLLST K..LPEPSS.  
 ..LQYLPYRD  
 HMGRclustalW{ rat} K..HIPAYKL ETLMETHERG VSIRRQLLSA K..LAEPSS.  
 ..LQYLPYRD  
 HMGRclustalW{ rabbit} K..HIPAYKL ETLMETHERG VSIRRQLLSK K..LPEPSS.  
 ..LQYLPYRD  
 HMGRclustalW{ human} K..HIPAYKL ETLMETHERG VSIRRQLLSK K..LSEPSS.  
 ..LQYLPYRD  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} K..HIPAYKL ETMMESPREG VAIRRQMLSD K..LPQRSA.  
 ..LQSLPYKN  
 HMGRclustalW{sea urchin} K..HIPAYKL ENILDNPERG VAVRRQIISK L..LPITDA.  
 ..LEKLPYAS  
 HMGRclustalW{ cockroach} G..HIAGYQL EKVVRNPERG VGIRRQILTK T..ADLKDA.  
 ..LDNLPYKN  
 HMGRclustalW{drosophila} GGTHCPLHKI ESVLDDPERG VRIRRQIIGS R..AKMPVGR  
 ..LDVLPYEH  
 HMGRclustalW{dictyostel} G..EVLAYRL ENELGDCSRA VEIRRMLLEK ....QLSKK.  
 ..IEPIPHEG  
 HMGRclustalW{schistosom} G..RLKTREL ESVVRNPFRA VELRRLDLS. ....TFLNNP  
 HIIERIPYKD  
 HMGRclustalW{archaeoglo} HYKSGKIRRA MSSRIPGFYK LSVEERLKKV AEFAGLSDEE  
 ..VKAVLSQG  
 HMGRclustalW{pseudomonas} .....MS LDSRLPAFRN LSPAARLDHI GQLLGLSHDD  
 ..VSLLANAG  
  
 Consensus G---IPSYSL ESKLGDCKRA VSIRREALSK K--LRITGSS --  
 LEGLPYEG

T002390" E2/E3E50



701

750

|                          |            |            |            |            |
|--------------------------|------------|------------|------------|------------|
| HMGRclustalW{methanobac} | IDMERASRRN | IENPIGVVQI | PLGVAGPLRV | RGEHADGEYY |
| VPLATSEAL                |            |            |            |            |
| HMGRclustalW{methanococ} | IDEEMAMKKN | IENMIGAIQI | PLGFAGPLKI | NGEYAKGEFY |
| IPLATTEGAL               |            |            |            |            |
| HMGRclustalW{halobacter} | FPAEAAES.A | IENMVGSIQV | PMGVAGPVS  | DGGSVAGEKY |
| LPLATTEGAL               |            |            |            |            |
| HMGRclustalW{sulfolobus} | IDYSEIKNKN | AENVIGAIQI | PLGIVGPIRV | NGDYAKGDFY |
| VPMATTEGAL               |            |            |            |            |
| HMGRclustalW{yeast2}     | YDYDRVFGAC | CENVIGYMPI | PVGIVGPLII | DGT....SYH |
| IPMATTEGCL               |            |            |            |            |
| HMGRclustalW{yeast1}     | YDYDRVFGAC | CENVIGYMPL | PVGIVGPLVI | DGT....SYH |

IPMATTEGCL  
 HMGRclustalW{phycomyces} .....  
 .PMATTEGCL  
 HMGRclustalW{ fusarium} YNWERFFGAC CENVIGYMPL PVGVAGPLVI DGQ....SYF  
 IPMATTEGVL  
 HMGRclustalW{ candida} YDYDRVFGAC CENVIGYMPL PVGVAGPLII DGK....PYH  
 IPMATTEGCL  
 HMGRclustalW{dictyoste2} FDYTKVLGAC CENVIGYIPI PVGVAGPILL DGK....LVS  
 IPMATTEGCL  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} MDYQAILGQC CEMPVGIVVQL PVGVAGPLLL DGR....EYH  
 VPMATTEGCL  
 HMGRclustalW{ corn} FDYASILGQC CELPVGIVVQL PVGVAGPLLL DGR....RFY  
 LPMATTEGCL  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} FDYESILGQC CEMAIGYVQI PVGIAGPLLL DGK....EYT  
 VPMATTEGCL  
 HMGRclustalW{rosyperiwi} FDYASILGQC CEMPVGIVVQL PVGIAGPLLL DGR....EYM  
 LPMATTEGCL  
 HMGRclustalW{ tomato} FNYESILGQC CEMPIGYVQI PVGIAGPLLL NGK....EFS  
 VPMATTEGCL  
 HMGRclustalW{woodtobacc} FDYESILGQC CEMPIGYVQI PVGIAGPLLL DGR....EYS  
 VPMATTEGCL  
 HMGRclustalW{ potato} FDYSSILGQC CEMPVGIVVQI PVGIAGPLLL DGR....EYS  
 VPMATTEGCL  
 HMGRclustalW{radish} FDYDSILGQC CEMPVGIVQI PVGIAGPLLL DGY....EYS  
 VPMATTEGCL  
 HMGRclustalW{arabadopsis1} FDYESILGQC CEMPVGIVQI PVGIAGPLLL DGY....EYS  
 VPMATTEGCL  
 HMGRclustalW{cucumismel} FDYESILGQC CEMPVGIVVQI PVGIAGPLLL DGF....EYT  
 VPMATTEGCL  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} FDYESILGQC CEMPVGIVVQI PVGIAGPLLL NGR....EYS  
 VPMATTEGCL  
 HMGRclustalW{camptothec} FDYDSILGQC CEMPVGIVVQI PVGIAGPLLL DGR....EYS  
 VPMATTEGCL  
 HMGRclustalW{arabadops2} FDYNSILGQC CEMPVGIVVQI PVGIAGPLLL DGV....EYS  
 VPMATTEGCL  
 HMGRclustalW{chineseham} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ  
 VPMATTEGCL  
 HMGRclustalW{chineseha2} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ  
 VPMATTEGCL  
 HMGRclustalW{syrianhamst} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ  
 VPMATTEGCL  
 HMGRclustalW{ rat} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ  
 VPMATTEGCL  
 HMGRclustalW{ rabbit} YNYSLVLGAC CENVIGYMPI PVGVVGPLCL DGK....EFQ  
 VPMATTEGCL  
 HMGRclustalW{ human} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DEK....EFQ  
 VPMATTEGCL  
 HMGRclustalW{ mouse} .....  
 .....  
 HMGRclustalW{ xenopus} YNYSLVMGAC CENVIGYMPI PVGVAGPLLL NNK....EYQ

FIG. 32DD

| Variable               | Mean        | SD         | Min | Max |
|------------------------|-------------|------------|-----|-----|
| Age                    | 38.5        | 10.2       | 22  | 65  |
| Gender                 | Male        | Female     |     |     |
| Marital status         | Married     | Single     |     |     |
| Education              | High school | College    |     |     |
| Occupation             | Manager     | Worker     |     |     |
| Income                 | \$30,000    | \$40,000   |     |     |
| Health status          | Good        | Fair       |     |     |
| Exercise frequency     | Weekly      | Monthly    |     |     |
| Stress level           | Low         | High       |     |     |
| Sleep quality          | Good        | Poor       |     |     |
| Dietary habits         | Healthy     | Unhealthy  |     |     |
| Alcohol consumption    | None        | Occasional |     |     |
| Tobacco use            | Non-smoker  | Smoker     |     |     |
| Family size            | 2           | 3          |     |     |
| Work hours             | 40          | 50         |     |     |
| Commuting time         | 30          | 45         |     |     |
| Living space           | Small       | Large      |     |     |
| Neighborhood safety    | Safe        | Unsafe     |     |     |
| Access to green spaces | Yes         | No         |     |     |
| Proximity to schools   | Close       | Far        |     |     |
| Public transportation  | Good        | Poor       |     |     |
| Crime rate             | Low         | High       |     |     |
| Weather conditions     | Good        | Poor       |     |     |
| Local amenities        | Many        | Few        |     |     |
| Community involvement  | High        | Low        |     |     |
| Overall satisfaction   | High        | Low        |     |     |

HMGCoA binding

FIG. 32EE

751

800  
 HMGRclustalW{methanobac} VASVNRGCSV ITRAGGATVR VTGDSMT.RA PVIRTGSVVE  
 ALQLREWIYE  
 HMGRclustalW{methanococ} VASVNRGCSI ITKCGGATVR VIDDKMT.RA PCLKTKSVVD  
 AIKVRDWIRE  
 HMGRclustalW{halobacter} LASVNRGCSV INSAGGATAR VLKSGMT.RA PVFRVADVAE  
 AEALVSWTRD  
 HMGRclustalW{sulfolobus} IASVNRGIKA VTLSGGVRAK VLKDEMT.RA PVFKFDSIEQ  
 IPNFLKFIEE  
 HMGRclustalW{ yeast2} VASAMRGCKA INAGGGATTV LTKDGMT.RG PVVRFPTLIR  
 SGACKIWLDS  
 HMGRclustalW{ yeast1} VASAMRGCKA INAGGGATTV LTKDGMT.RG PVVRFPTLKR  
 SGACKIWLDS  
 HMGRclustalW{phycomyces} VASTARGCKA INAGGGASTI VIADGMT.RG PCVEFPTILR  
 AAACKLWIEN  
 HMGRclustalW{ fusarium} VASASRGCKA INSGGGAITV LTADGMT.RG PCVAFETLER  
 AGAAKLWLDS  
 HMGRclustalW{ candida} VASAMRGCKA INLGGGVTTV LTKDGMT.RG PCVKFPSLKR  
 AGQCKLWLDS  
 HMGRclustalW{dictyoste2} VASTHRGAKA ITKSGGAKTV LLQSGMT.RA PVCRLPSSIR  
 AGELKQWIEN  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} VASVNRVQG HLVSGGAFSV LLRDAMS.RA PAVKLPCPMR  
 AAELKAFAEA  
 HMGRclustalW{ corn} VASTNRGCKA IAESGGATSV VLRDAMT.RA PVARFPTARR  
 AAELKAFLED  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} VASANRGCKA IYASGGATSV LLRDGMT.RA PVVRFPTAKR  
 AADLKFFMED  
 HMGRclustalW{rosyperiwi} VASTNRGCKA ILASGGANSV LLRDGMT.RA PVVRFGTAKR  
 AAELKFYMED  
 HMGRclustalW{ tomato} VASTNRGCKA IYASGGATCI LLRDGMT.RA PCVRFGTAKR  
 AAELKFFVED  
 HMGRclustalW{woodtobacc} VASTNRGCKA IYASGGATSV LLRDGMT.RA PCVRFGTAKR  
 AAELKFFVED  
 HMGRclustalW{ potato} VASTNRGCKA IFVSGGADSV LLRDGMT.RA PVVRFTTAKR  
 AAELKFFVED  
 HMGRclustalW{radish} VASTNRGCKA MYVSGGATST VLKDEMT.RA PVVRFASARR  
 ASELKFFLES  
 HMGRclustalW{arabadopsis1} VASTNRGCKA MFISGGATST VLKDEMT.RA PVVRFASARR  
 ASELKFFLEN  
 HMGRclustalW{cucumismel} VASTNRGCKA IYASGGATSM LLKDEMT.RA PVVRFSAKR  
 ASELKFFLED  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertrel1} VASTNRGCKA IYLSGGATSV LLKDEMT.RA PVVRFASATR  
 AAELKFFLED  
 HMGRclustalW{camptothec} VASTNRGCKA IFACGGATSV LLRDAMT.RA PVVRFSAKR  
 AADLKFFLEN  
 HMGRclustalW{arabadops2} VASTNRGCKA IHLGGGAFSV LVKDAMT.RA PVVRFPSARR  
 AALVMFYLQD  
 HMGRclustalW{chineseham} VASTNRGCRA IGLGGGASSR VLADGMT.RG PVVRLPRACD  
 SAEVKAWLET

T00290" E325850

| Variable           | Prevalence (%) |                     | Prevalence (95% CI) |                     | p-value |
|--------------------|----------------|---------------------|---------------------|---------------------|---------|
|                    | Prevalence (%) | Prevalence (95% CI) | Prevalence (%)      | Prevalence (95% CI) |         |
| Age                |                |                     |                     |                     |         |
| < 18               | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| 18-24              | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| 25-34              | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| 35-44              | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| 45-54              | 2.4            | 1.6-3.2             | 2.4                 | 1.6-3.2             | 0.95    |
| 55-64              | 2.7            | 1.9-3.5             | 2.7                 | 1.9-3.5             | 0.95    |
| 65-74              | 3.0            | 2.2-3.8             | 3.0                 | 2.2-3.8             | 0.95    |
| 75-84              | 3.3            | 2.5-4.1             | 3.3                 | 2.5-4.1             | 0.95    |
| 85+                | 3.6            | 2.8-4.4             | 3.6                 | 2.8-4.4             | 0.95    |
| Gender             |                |                     |                     |                     |         |
| Male               | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Female             | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| Ethnicity          |                |                     |                     |                     |         |
| White              | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| Black              | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Hispanic           | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| Other              | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| Education          |                |                     |                     |                     |         |
| < High school      | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| High school        | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Some college       | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| College graduate   | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| Postgraduate       | 2.4            | 1.6-3.2             | 2.4                 | 1.6-3.2             | 0.95    |
| Income             |                |                     |                     |                     |         |
| < \$10,000         | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| \$10,000-\$20,000  | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| \$20,000-\$30,000  | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| \$30,000-\$40,000  | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| \$40,000-\$50,000  | 2.4            | 1.6-3.2             | 2.4                 | 1.6-3.2             | 0.95    |
| \$50,000-\$60,000  | 2.7            | 1.9-3.5             | 2.7                 | 1.9-3.5             | 0.95    |
| \$60,000-\$70,000  | 3.0            | 2.2-3.8             | 3.0                 | 2.2-3.8             | 0.95    |
| \$70,000-\$80,000  | 3.3            | 2.5-4.1             | 3.3                 | 2.5-4.1             | 0.95    |
| \$80,000-\$90,000  | 3.6            | 2.8-4.4             | 3.6                 | 2.8-4.4             | 0.95    |
| \$90,000-\$100,000 | 3.9            | 3.1-4.7             | 3.9                 | 3.1-4.7             | 0.95    |
| \$100,000+         | 4.2            | 3.4-5.0             | 4.2                 | 3.4-5.0             | 0.95    |
| Marital status     |                |                     |                     |                     |         |
| Married            | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Single             | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| Divorced           | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| Widowed            | 2.4            | 1.6-3.2             | 2.4                 | 1.6-3.2             | 0.95    |
| Health insurance   |                |                     |                     |                     |         |
| Medicaid           | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| Medicare           | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Private            | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| Uninsured          | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| Other              | 2.4            | 1.6-3.2             | 2.4                 | 1.6-3.2             | 0.95    |
| Comorbidities      |                |                     |                     |                     |         |
| Hypertension       | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| Diabetes           | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Cholesterol        | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| Obesity            | 2.1            | 1.3-2.9             | 2.1                 | 1.3-2.9             | 0.95    |
| Smoking            |                |                     |                     |                     |         |
| Current            | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| Former             | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Never              | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0.95    |
| Alcohol            |                |                     |                     |                     |         |
| Current            | 1.2            | 0.5-2.0             | 1.2                 | 0.5-2.0             | 0.95    |
| Former             | 1.5            | 0.7-2.3             | 1.5                 | 0.7-2.3             | 0.95    |
| Never              | 1.8            | 1.0-2.6             | 1.8                 | 1.0-2.6             | 0       |

## Consensus

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850  
 HMGRclustalW{methanobac} NM..DALREE AESTTRHGKL VKIDPI.... IVAGSYVYPR  
 FVYTTGDSMG  
 HMGRclustalW{methanococ} NF..ERIKEV AESTTRHGKL IKIEPI.... LIVGRNLYPR  
 FVFKTGDAMG  
 HMGRclustalW{halobacter} NF..AALKEA AEETTNGHGL LDVTP..... YVVGNSVYLR  
 FRYDTKDAMG  
 HMGRclustalW{sulfolobus} NL..EKIRNI ANSTSHHGKL KSITP..... FVLGNNVWLR  
 FSFETGDAMG  
 HMGRclustalW{ yeast2} EEGQNSIKKA FNSTSRFARL QHIQT..... CLAGDLLFMR  
 FRTTTGDAMG  
 HMGRclustalW{ yeast1} EEGQNAIKKA FNSTSRFARL QHIQT..... CLAGDLLFMR  
 FRTTTGDAMG  
 HMGRclustalW{phycomyces} EG.NDIVTNA FNSTSRFARL RKLKI..... ALAGKLVFIR  
 FSTTTGDAMG  
 HMGRclustalW{ fusarium} EAGQDMMKKA FNSTSRFARL QSMKT..... ALAGTNLYIR  
 FKTTTGDAMG  
 HMGRclustalW{ candida} DEGQEEMKKA FNSTSRFARL QHLQT..... ALAGDLLFIR  
 FRTVTGDAMG  
 HMGRclustalW{dictyoste2} QENFYQVASA FNSTSRFARL KSIKV..... VIAGRLVYLR  
 FKSSTGDAMG  
 HMGRclustalW{wheat1} .....  
 ....GDAMG  
 HMGRclustalW{ rice} PANFELLAAB FNRSSRFARL QDIRC..... ALAGRNLYMR  
 FSCITGDAMG  
 HMGRclustalW{ corn} PANFDTLSVV FNRSSRFARL QGVQC..... AMAGRNLYMR  
 FSCSTGDAMG  
 HMGRclustalW{wheat3} .....  
 ....GDAMG  
 HMGRclustalW{wheat2} .....  
 ....GDAMG  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} PDNFDTIABV FNKSSRFARL QSVQC..... AIAGKNLYMR  
 FSCSTGDAMG  
 HMGRclustalW{rosyperiwi} TQNFETISVV FNKSSRFARL QSVQC..... AIAGKNLYIR  
 FSCSTGDAMG  
 HMGRclustalW{ tomato} PIKFESLANV FNQSSRFARL QRIQC..... AIAGKNLYMR  
 LCCSTGDAMG  
 HMGRclustalW{woodtobacc} PVKFETLAAV FNQSSRFARL QRIQC..... AIAGKNLYMR  
 FVCSTGDAMG  
 HMGRclustalW{ potato} PLNFETLSLM FNKSSRFARL QGIQC..... AIAGKNLYIT  
 FSCSTGDAMG  
 HMGRclustalW{radish} PENFETLAVV FNRSSRFARL QVMC..... TLAGKNAYVR  
 FSCSTGDAMG  
 HMGRclustalW{arabadosis1} PENFDTLAVV FNRSSRFARL QSVKC..... TIAGKNAYVR  
 FCCSTGDAMG  
 HMGRclustalW{cucumismel} PSNFDTLAVV FNRSSRFARL QSIRC..... SIAGKNLYVR  
 FCCSTGDAMG  
 HMGRclustalW{rubbertre2} .....  
 .....  
 HMGRclustalW{rubbertre1} PDNFDTLAVV FNKSSRFARL QGIKC..... SIAGKNLYIR  
 FSCSTGDAMG  
 HMGRclustalW{camptothec} PLNFETLAAV FNSSSRFGKL QNIKC..... AIAGKNLYMR  
 YSCSTGDAMG  
 HMGRclustalW{arabados2} PSNFERLSLI FNKSSRFARL QSITC..... TIAGRNLYPR  
 FACSTGDAMG  
 HMGRclustalW{chineseham} PEGFAVIKDA FDSTSRFARL QKLHV..... TMAGRNLYIR  
 FQSKTGDAMG

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|                           |            |            |            |             |
|---------------------------|------------|------------|------------|-------------|
| HMGRclustalW{chineseha2}  | PEGFAVIKDA | FDSTSRFARL | QKLHV..... | TMAGRNLVIR  |
| FQSKTGDAMG                |            |            |            |             |
| HMGRclustalW{syrianhamst} | PEGFAVIKDA | FDSTSRFARL | QKLHV..... | TMAGRNLVIR  |
| FQSKTGDAMG                |            |            |            |             |
| HMGRclustalW{rat}         | PEGFAVVKEA | FDSTSRFARL | QKLHV..... | TLAGRNLVIR  |
| LQSKTGDAMG                |            |            |            |             |
| HMGRclustalW{rabbit}      | PEGFAVIKEA | FDSTSRFARL | QKLHI..... | SMAGRNLVIR  |
| FQSRSGDAMG                |            |            |            |             |
| HMGRclustalW{human}       | SEGFAVIKEA | FDSTSRFARL | QKLHT..... | SIAGRNLVIR  |
| FQSRSGDAMG                |            |            |            |             |
| HMGRclustalW{mouse}       | .....      | .....      | .....      | .....       |
| .....                     |            |            |            |             |
| HMGRclustalW{xenopus}     | AEGFKVIKDA | FDSTSRFARL | GRLQN..... | CVAGRNLVIR  |
| FQSKTGDAMG                |            |            |            |             |
| HMGRclustalW{sea urchin}  | PENFAAIKER | FESTSRFAKL | KSIQT..... | ALAGRYMFLR  |
| FKALTGDAMG                |            |            |            |             |
| HMGRclustalW{cockroach}   | PYNFEQIKKN | FDSTSRFARL | SKIHI..... | RVAGRHLFIR  |
| FIATTGDAMG                |            |            |            |             |
| HMGRclustalW{drosophila}  | DENYRVVYTE | FDSTSRFGRL | KDCHI..... | AMDGPQLVIR  |
| FVAITGDRMG                |            |            |            |             |
| HMGRclustalW{dictyostel}  | TDNYQALKAV | FDSTSRFARL | SAIKC..... | TIAGRSVYIR  |
| FKCDTGDAMG                |            |            |            |             |
| HMGRclustalW{schistosom}  | EEGFQTLKSA | FDKTSAHVNL | LSVFA..... | CPAGRYIHIR  |
| FAARTGDAMG                |            |            |            |             |
| HMGRclustalW{archaeoglo}  | EIIERANECD | PMLVNLGGGC | KDIEAR.VID | TIMGKMLIVH  |
| LIVDVKDAMG                |            |            |            |             |
| HMGRclustalW{pseudomonas} | EIIELANRKD | QLLNSLGGGC | RDIEVHTFAD | TPRGPMMLVAH |
| LIVDVRDAMG                |            |            |            |             |
|                           | Consensus  | PENFETLK-A | FNSTSRFARL | QSIQC-----  |
| FSCSTGDAMG                |            |            |            | AIAGRNLVIR  |

NADH binding domain 1

(continued)

FIG. 32II

900  
 HMGRclustalW{methanobac} MNMVTIATER ALELLT...R ETGAHV..IA LSGNLCCTDKK  
 PAAVNLIEGR  
 HMGRclustalW{methanococ} MNMVTIATEK ACNFIEGELK KEGIFVKTV VSGNACVDKK  
 PSGMNLINGR  
 HMGRclustalW{halobacter} MNMATIATEA VCGVVE...A ETAASL..VA LSGNLCSDKK  
 PAAINAVEGR  
 HMGRclustalW{sulfolobus} MNMVTIAVEK VCEFIE.... ENFPSADCLA VSGNMCSDKK  
 QTNVNSLFGR  
 HMGRclustalW{ yeast2} MNMISKGVEY SLKQMVVEY. .GWEDMEVVS VSGNYCTDKK  
 PAAINWIEGR  
 HMGRclustalW{ yeast1} MNMISKGVEY SLKQMVVEY. .GWEDMEVVS VSGNYCTDKK  
 PAAINWIEGR  
 HMGRclustalW{phycomyces} MNM.....  
 .....  
 HMGRclustalW{ fusarium} MNMISKGVEH ALSVMANDG. .GFDDMQIIS VSGNYCTDKK  
 AAALNWIDGR  
 HMGRclustalW{ candida} MNMISKGVEY ALKQMTEVF. .GWDDMMVVS VSGNYCTDKK  
 PAAVNWINGR  
 HMGRclustalW{dictyoste2} MNMVSKGVEK ALEVITEY.. .FPMEVLS LSGNVCTDKK  
 PSSINWLEGR  
 HMGRclustalW{wheat1} MNMVSKGVEN VLG YIRNN.. .FPDMDVIS ISGNYCSDKK  
 ATAVNWIDGR  
 HMGRclustalW{ rice} MNMVSKGVEN VLG YLQNV.. .FPDMDVIS VSGNYCSDKK  
 PTAVNWIEGR  
 HMGRclustalW{ corn} MNMVSKGVQN VLD FLQDD.. .FHDMDVIS ISGNFCSDKK  
 PSAVNWIEGR  
 HMGRclustalW{wheat3} MNMISKGVQN VLD YLQDD.. .FPDMDVIS ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{wheat2} MNMISKGVQH VLD YLEED.. .FPDMDVVS ISGNFCSDKK  
 SAAVNWIEGR  
 HMGRclustalW{ soybean} .....  
 .....  
 HMGRclustalW{rubbertre3} MNMVSKAVQN VID YLQND.. .FPDMDVIG LTGNFCADKK  
 AAAVNWIEGR  
 HMGRclustalW{rosyperiwi} MNMVSKGVQN VLE FLQTD.. .YPDMDVLG ISGNFCADKK  
 PAAVNWIEGR  
 HMGRclustalW{ tomato} MNMVSKGVQN VLD YLQNE.. .YPDMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{woodtobacc} MNMVSKGVQN VLD YLQNE.. .YPDMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{ potato} MNMVSKGVQN VLD YLQSE.. .YPDMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{radish} MNMVSKGVQN VLE FLTED.. .FPDMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{arabadopsis1} MNMVSKGVQN VLE YLTDD.. .FPDMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{cucumismel} MNMVSKGVQN VLE FLQHD.. .FSDMEVIG ISGNFCADKK  
 PAAVNWIEGR  
 HMGRclustalW{rubbertre2} .....LESD.. .FADMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{rubbertre1} MNMVSKGVQN VLE FLQSD.. .FSDMDVIG ISGNFCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{camptothec} MNMISKGVQN VLD FLQDD.. .FPDMDVIG ISGNYCSDKK  
 PAAVNWIEGR  
 HMGRclustalW{arabadops2} MNMVSKGVQN VLD FVKSE.. .FPDMDVIG ISGNYCSDKK  
 ASAVNWIEGR  
 HMGRclustalW{chineseham} MNMISKGTEK ALL KLQEF.. .FPQMILA VSGNYCTDKK  
 PAAINWIEGR

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|                           |            |            |            |            |
|---------------------------|------------|------------|------------|------------|
| HMGRclustalW{chinese2}    | MNMISKGTEK | ALLKLQEF.. | ..FPEMQILA | VSGNYCTDKK |
| PAAINWIEGR                |            |            |            |            |
| HMGRclustalW{syrianhamst} | MNMISKGTEK | ALVKLQEF.. | ..FPEMQILA | VSGNYCTDKK |
| PAAVNWIEGR                |            |            |            |            |
| HMGRclustalW{rat}         | MNMISKGTEK | ALLKLQEG.. | ..VPELQILA | VSGNYCTDKK |
| PAAINWIEGR                |            |            |            |            |
| HMGRclustalW{rabbit}      | MNMISKGTEK | ALSKLHEY.. | ..FPEMQILA | VSGNYCTDKK |
| PAAVNWIEGR                |            |            |            |            |
| HMGRclustalW{human}       | MNMISKGTEK | ALSKLHEY.. | ..FPEMQILA | VSGNYCTDKK |
| PAAINWIEGR                |            |            |            |            |
| HMGRclustalW{mouse}       | .....EK    | ALLKLQEF.. | ..FPDMQILA | VSGNYCTDKK |
| PAAINWIEGR                |            |            |            |            |
| HMGRclustalW{xenopus}     | MNMISKVTEQ | ALARLQEE.. | ..FPDLHVLA | VSGNYCTDKK |
| PAAINWIEGR                |            |            |            |            |
| HMGRclustalW{sea urchin}  | MNMISKGTEQ | ALHALQTM.. | ..FPNIEIMS | LSGNYCTDKK |
| VAAINWIEGR                |            |            |            |            |
| HMGRclustalW{cockroach}   | MNMLSKGTEV | ALAYVQQV.. | ..YPDMEILS | LSGNFCTDKK |
| PAAVNWIEGR                |            |            |            |            |
| HMGRclustalW{drosophila}  | MNMVSKALRW | PFAEFTLH.. | ..FPDMQIIS | LSGNFCCDKK |
| PAAINWIKGR                |            |            |            |            |
| HMGRclustalW{dictyostel}  | MNMVSKGVEA | VLEHLKII.. | ..FDDMTLLS | ISGNMCTDKK |
| PSSINWTEGR                |            |            |            |            |
| HMGRclustalW{schistosom}  | MNMVSKATDS | ALHCLKKY.. | ..FSNMQVIS | LSGNMCTDKK |
| PATINTILGR                |            |            |            |            |
| HMGRclustalW{archaeoglo}  | ANAVNTMCEK | VAPFIERITG | .GKVYLRIIS | NLAAYRLARA |
| KAVFDKDVIG                |            |            |            |            |
| HMGRclustalW{pseudomonas} | ANTVNTMAEA | VAPLMEAITG | .GQVRLRILS | NLADLRLARA |
| QVRITPQQLE                |            |            |            |            |
|                           | Consensus  | MNMVSKGVEN | VL--LQED-- | -GFPDMDVIS |
| PAAVNWIEGR                |            |            |            | ISGNYCTDKK |

NADH binding domain 1 (concluded)

FIG. 32 KK

| Variable           | Mean        | SD      | Min | Max |
|--------------------|-------------|---------|-----|-----|
| Age                | 34.5        | 10.2    | 21  | 55  |
| Gender             | Male        | Female  |     |     |
| Marital status     | Married     | Single  |     |     |
| Education          | High school | College |     |     |
| Occupation         | Manager     | Worker  |     |     |
| Income             | Low         | High    |     |     |
| Health status      | Good        | Poor    |     |     |
| Stress level       | Low         | High    |     |     |
| Life satisfaction  | Low         | High    |     |     |
| Depression         | Low         | High    |     |     |
| Loneliness         | Low         | High    |     |     |
| Self-esteem        | Low         | High    |     |     |
| Resilience         | Low         | High    |     |     |
| Optimism           | Low         | High    |     |     |
| Gratitude          | Low         | High    |     |     |
| Forgiveness        | Low         | High    |     |     |
| Empathy            | Low         | High    |     |     |
| Prosocial behavior | Low         | High    |     |     |
| Altruism           | Low         | High    |     |     |
| Compassion         | Low         | High    |     |     |
| Kindness           | Low         | High    |     |     |
| Generosity         | Low         | High    |     |     |
| Cooperativeness    | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |
| Agreeableness      | Low         | High    |     |     |
| Neuroticism        | Low         | High    |     |     |
| Extraversion       | Low         | High    |     |     |
| Conscientiousness  | Low         | High    |     |     |
| Openness           | Low         | High    |     |     |

| 950                        |            |            |            |            |
|----------------------------|------------|------------|------------|------------|
| HMGRclustalW{methanobac}   | GKSITAEITV | PGEMVESVLK | TTPEAVVEVN | TAKNLIGSAA |
| AG..SMG.FN                 |            |            |            |            |
| HMGRclustalW{methanococ}   | GKSIVAEVFL | TEKEVNKYLK | TTSQAIAEVN | RLKNYIGSAI |
| SN..SMG.FN                 |            |            |            |            |
| HMGRclustalW{halobacter}   | GRSVTADVRI | PREVVEERLH | TTPERGRELN | TRKNLVGSAK |
| AA..SLG.FN                 |            |            |            |            |
| HMGRclustalW{sulfolobus}   | GKTVLAEALI | KKDVIRNILH | SNAQLIHDIN | LRKNWLGTAR |
| AG..SLSQFN                 |            |            |            |            |
| HMGRclustalW{ yeast2}      | GKSVVAEATI | PGDVVKSVLK | SDVSALVELN | ISKNLVGSAM |
| AG..SVGGFN                 |            |            |            |            |
| HMGRclustalW{ yeast1}      | GKSVVAEATI | PGDVVRKVLK | SDVSALVELN | IAKNLVGSAM |
| AG..SVGGFN                 |            |            |            |            |
| HMGRclustalW{phycomyces}   | .....      | .....      | .....      | .....      |
| .....                      |            |            |            |            |
| HMGRclustalW{ fusarium}    | GKGVVAEAI  | PGEVVRSVLK | SDVDSLVELN | VAKNLIGSAM |
| AG..SVGGFN                 |            |            |            |            |
| HMGRclustalW{ candida}     | GKSVVAEASI | PKDAVVKVLK | SSVKAVVDVN | VNKNLIGSAM |
| AG..SVGGFN                 |            |            |            |            |
| HMGRclustalW{dictyoste2}   | GKSVVAEAVI | SGDIVRDVLK | TTVEALVSLN | IDKNLIGSAM |
| AG..SIGGFN                 |            |            |            |            |
| HMGRclustalW{wheat1}       | GKSVVCEATI | KGRVVQSVID | TTVEKLVELN | IIKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{ rice}        | GKSVVCEAII | KGDVVQKVLK | TTVEKLVELN | IIKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{ corn}        | GKSVVCEAVI | GEEVVKKVLK | TDVQSLVELN | TIKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{wheat3}       | GKSVVCEAVI | REELLKKVLK | TNVQSLVELN | VIKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{wheat2}       | GKSVVCEAII | REEVVEKVLD | TNVQSLVELN | VIKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{ soybean}     | .....      | .....LK    | TNVSALVELN | MLKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{rubbertre3}   | GKSVVCEAII | KEEVVKKVLK | TNVAALVELN | MIKNLTGSAV |
| AG..SLGGFN                 |            |            |            |            |
| HMGRclustalW{rosyperiwi}   | GKSVVCEAII | KEEIVKTVLK | TEVAALIELN | MVKNLAGSAI |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{ tomato}      | GKSVVCEAII | TEEVVKKVLK | TEVAALVELN | MLKNLTGSAM |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{woodtobacc}   | GKSVVCEAII | TEEVVKKVLK | TEVAALVELN | MLKNLTGSAM |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{ potato}      | GKSVVCEAII | KEEVVKKVLK | TEVAALVELN | MLKNLTGSAM |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{radish}       | GKSVVCEAVI | RGETVNKVLK | TSVASLVELN | MLKNLTGSAI |
| AG..SLGGFN                 |            |            |            |            |
| HMGRclustalW{arabidopsis1} | GKSVVCEAVI | RGEIVNKVLK | TSVAALVELN | MLKNLAGSAV |
| AG..SLGGFN                 |            |            |            |            |
| HMGRclustalW{cucumismel}   | GKSVVCEAVI | KDEVVRKVLK | TSVASLVELN | MLKNLTGSAM |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{rubbertre2}   | GKSVVCEAII | KEEVVKKVLK | TDVALLVELN | MLKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{rubbertrel}   | GKSVVCEAII | KEEVVKKVLK | TNVAALVELN | MLKNLAGSAV |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{camptothec}   | GKSVVCEAVI | KEEVVKKVLK | TNVAALVELN | MLKNLTGSAM |
| AG..ALGGFN                 |            |            |            |            |
| HMGRclustalW{arabidops2}   | GKHVVCEAFI | KAEIVEKVLK | TSVEALVELN | TLKNLVGSAM |
| AG..SLGGFN                 |            |            |            |            |
| HMGRclustalW{chineseham}   | GKTVVCEAVI | PAKVVRVLK  | TTTEAMIDVN | INKNLVGSAM |

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AG..SIGGYN
  HMGRclustalW{chineseha2} GKTVVCEAVI PAKVVREVLK TTTEAMIDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{syrianhamst} GKTVVCEAVI PARVVREVLK TTTEAMIDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      rat} GKTVVCEAVI PAKVVREVLK TTTEAMVDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      rabbit} GKTVVCEAVI PAKVVREVLK TTTEAMIDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      human} GKSJVCEAVI PAKVVREVLK TTTEAMIEVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      mouse} GKTVVCEAVI PAKVVREVLK TTTEAMVDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      xenopus} GKSJVCEAVI PAKVVREVLK SSTEALVEVN INKNFIGSAM
AG..SIGGYN
  HMGRclustalW{sea urchin} GKSJVCEATV PAHIVQQVLK TSASALVDLN IHKNLVGSAM
AG..SIGGFN
  HMGRclustalW{cockroach} GKSJVCEAIV PADIIKSVLK TSVQALMDVN ITKNLIGSAV
AG..SIGGFN
  HMGRclustalW{drosophila} GKRVTCTI SAATLRSLK TDAKTLVECN KLKMMGGSAM
AG..SIGGNN
  HMGRclustalW{dictyostel} GRSJVCEAMI TGDVVQRVLK TNVQALVDLN IAKNLIGSAM
AG..SIGGFN
  HMGRclustalW{schistosom} GKSVIAEAHL SADVLAQVLH TNAQRLARLT HSKNWIGSAM
AGCPGMMGCN
  HMGRclustalW{archaeoglo} .....GEEVV EGIMLAYAFA AADPFRCATH NKGIMNGISA
LM.....
  HMGRclustalW{pseudomonas} TAEFSGEAVI EGILDAYAFA AVDPYRAATH NKGIMNGIDP
LI.....

                Consensus GKSJVCEAVI PAEVVRKVLK TTVEALVELN ILKNLVGSAM AG--
SLGGFN

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K

FIG. 32MM

[illegible]

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FIG. 32NN

[illegible]

*D*



|  | 1990-1991 | 1991-1992 | 1992-1993 | 1993-1994 | 1994-1995 | 1995-1996 | 1996-1997 | 1997-1998 | 1998-1999 | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | 2022-2023 | 2023-2024 | 2024-2025 | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 | 2029-2030 | 2030-2031 | 2031-2032 | 2032-2033 | 2033-2034 | 2034-2035 | 2035-2036 | 2036-2037 | 2037-2038 | 2038-2039 | 2039-2040 | 2040-2041 | 2041-2042 | 2042-2043 | 2043-2044 | 2044-2045 | 2045-2046 | 2046-2047 | 2047-2048 | 2048-2049 | 2049-2050 | 2050-2051 | 2051-2052 | 2052-2053 | 2053-2054 | 2054-2055 | 2055-2056 | 2056-2057 | 2057-2058 | 2058-2059 | 2059-2060 | 2060-2061 | 2061-2062 | 2062-2063 | 2063-2064 | 2064-2065 | 2065-2066 | 2066-2067 | 2067-2068 | 2068-2069 | 2069-2070 | 2070-2071 | 2071-2072 | 2072-2073 | 2073-2074 | 2074-2075 | 2075-2076 | 2076-2077 | 2077-2078 | 2078-2079 | 2079-2080 | 2080-2081 | 2081-2082 | 2082-2083 | 2083-2084 | 2084-2085 | 2085-2086 | 2086-2087 | 2087-2088 | 2088-2089 | 2089-2090 | 2090-2091 | 2091-2092 | 2092-2093 | 2093-2094 | 2094-2095 | 2095-2096 | 2096-2097 | 2097-2098 | 2098-2099 | 2099-2100 | 2100-2101 | 2101-2102 | 2102-2103 | 2103-2104 | 2104-2105 | 2105-2106 | 2106-2107 | 2107-2108 | 2108-2109 | 2109-2110 | 2110-2111 | 2111-2112 | 2112-2113 | 2113-2114 | 2114-2115 | 2115-2116 | 2116-2117 | 2117-2118 | 2118-2119 | 2119-2120 | 2120-2121 | 2121-2122 | 2122-2123 | 2123-2124 | 2124-2125 | 2125-2126 | 2126-2127 | 2127-2128 | 2128-2129 | 2129-2130 | 2130-2131 | 2131-2132 | 2132-2133 | 2133-2134 | 2134-2135 | 2135-2136 | 2136-2137 | 2137-2138 | 2138-2139 | 2139-2140 | 2140-2141 | 2141-2142 | 2142-2143 | 2143-2144 | 2144-2145 | 2145-2146 | 2146-2147 | 2147-2148 | 2148-2149 | 2149-2150 | 2150-2151 | 2151-2152 | 2152-2153 | 2153-2154 | 2154-2155 | 2155-2156 | 2156-2157 | 2157-2158 | 2158-2159 | 2159-2160 | 2160-2161 | 2161-2162 | 2162-2163 | 2163-2164 | 2164-2165 | 2165-2166 | 2166-2167 | 2167-2168 | 2168-2169 | 2169-2170 | 2170-2171 | 2171-2172 | 2172-2173 | 2173-2174 | 2174-2175 | 2175-2176 | 2176-2177 | 2177-2178 | 2178-2179 | 2179-2180 | 2180-2181 | 2181-2182 | 2182-2183 | 2183-2184 | 2184-2185 | 2185-2186 | 2186-2187 | 2187-2188 | 2188-2189 | 2189-2190 | 2190-2191 | 2191-2192 | 2192-2193 | 2193-2194 | 2194-2195 | 2195-2196 | 2196-2197 | 2197-2198 | 2198-2199 | 2199-2200 | 2200-2201 | 2201-2202 | 2202-2203 | 2203-2204 | 2204-2205 | 2205-2206 | 2206-2207 | 2207-2208 | 2208-2209 | 2209-2210 | 2210-2211 | 2211-2212 | 2212-2213 | 2213-2214 | 2214-2215 | 2215-2216 | 2216-2217 | 2217-2218 | 2218-2219 | 2219-2220 | 2220-2221 | 2221-2222 | 2222-2223 | 2223-2224 | 2224-2225 | 2225-2226 | 2226-2227 | 2227-2228 | 2228-2229 | 2229-2230 | 2230-2231 | 2231-2232 | 2232-2233 | 2233-2234 | 2234-2235 | 2235-2236 | 2236-2237 | 2237-2238 | 2238-2239 | 2239-2240 | 2240-2241 | 2241-2242 | 2242-2243 | 2243-2244 | 2244-2245 | 2245-2246 | 2246-2247 | 2247-2248 | 2248-2249 | 2249-2250 | 2250-2251 | 2251-2252 | 2252-2253 | 2253-2254 | 2254-2255 | 2255-2256 | 2256-2257 | 2257-2258 | 2258-2259 | 2259-2260 | 2260-2261 | 2261-2262 | 2262-2263 | 2263-2264 | 2264-2265 | 2265-2266 | 2266-2267 | 2267-2268 | 2268-2269 | 2269-2270 | 2270-2271 | 2271-2272 | 2272-2273 | 2273-2274 | 2274-2275 | 2275-2276 | 2276-2277 | 2277-2278 | 2278-2279 | 2279-2280 | 2280-2281 | 2281 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
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|                           |                          |            |            |            |           |
|---------------------------|--------------------------|------------|------------|------------|-----------|
| 1050                      | HMGRclustalW{methanobac} | AVNLPDVPLA | TVGGGTGLET | ASECLDIMGV | RGGG..... |
| RVHAFAEIVG                |                          |            |            |            |           |
| HMGRclustalW{methanococ}  | SVTLPDVPIG               | TVGGGTRVET | QKECLEMLGC | YGDN.....  |           |
| KALKFAEIVG                |                          |            |            |            |           |
| HMGRclustalW{halobacter}  | SVSIASLEV                | TVGGGTKLPT | QSEGLDILGV | SGGGDP.AGS |           |
| NADALAECIA                |                          |            |            |            |           |
| HMGRclustalW{sulfolobus}  | SVTLPSLEV                | TVGGGTRLPT | QKEALSIMGV | YSGNP.PGS  |           |
| NAKKLAEIIA                |                          |            |            |            |           |
| HMGRclustalW{yeast2}      | SVSMPSIEV                | TIGGGTVLEP | QGAMLDLLGV | RGPHPTPGA  |           |
| NARQLARIIA                |                          |            |            |            |           |
| HMGRclustalW{yeast1}      | SVSMPSIEV                | TIGGGTVLEP | QGAMLDLLGV | RGPHTAPGT  |           |
| NARQLARIVA                |                          |            |            |            |           |
| HMGRclustalW{phycomyc}    | .....                    | .....      | .....      | .....      |           |
| .....                     |                          |            |            |            |           |
| HMGRclustalW{fusarium}    | SVSMPSLEV                | TLGGGTILEP | QGAMLDILGV | RGSHTNP    |           |
| NARRIARIIG                |                          |            |            |            |           |
| HMGRclustalW{candida}     | SVSMPSIEV                | TIGGGTILDP | QGSMLLELGV | RG.PADVPGE |           |
| NARQLAKIVA                |                          |            |            |            |           |
| HMGRclustalW{dictyoste2}  | SVTMPSIEV                | TVGGGTHLPA | QSACLDLLKI | RGANLERPGA |           |
| NSEQLARVVA                |                          |            |            |            |           |
| HMGRclustalW{wheat1}      | SVTMPPIEV.               | .....      | .....      | .....      |           |
| .....                     |                          |            |            |            |           |
| HMGRclustalW{rice}        | SVTMPSIEV                | TIGGGTCLAS | QAACLNLLGV | KGSNHGSPGA |           |
| NAGRLATIVA                |                          |            |            |            |           |
| HMGRclustalW{corn}        | SVTMPSIEV                | TVGGGTQLAS | QSACLDLLGV | RGASDRPGS  |           |
| NARLLATVVA                |                          |            |            |            |           |
| HMGRclustalW{wheat3}      | SVTMPPIEV.               | .....      | .....      | .....      |           |
| .....                     |                          |            |            |            |           |
| HMGRclustalW{wheat2}      | SVTMPPIEV.               | .....      | .....      | .....      |           |
| .....                     |                          |            |            |            |           |
| HMGRclustalW{soybean}     | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGASKESPGS |           |
| NSRLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{rubbertre3}  | SVSMPSIELG               | TVGGGTQLAS | QSACLNLLGV | KGASKDSPGS |           |
| NSRLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{rosyperiwi}  | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGASKDSPGA |           |
| NSRLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{tomato}      | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGANREAPGS |           |
| NARLLATVVA                |                          |            |            |            |           |
| HMGRclustalW{woodtobacc}  | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGANREVPGS |           |
| NARLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{potato}      | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGANRDAPGS |           |
| NARLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{radish}      | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGASKESPGM |           |
| NSRRLATIVA                |                          |            |            |            |           |
| HMGRclustalW{arabadosis1} | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGASTESPGM |           |
| NARRLATIVA                |                          |            |            |            |           |
| HMGRclustalW{cucumismel}  | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGASKESPGA |           |
| NSRLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{rubbertre2}  | SVTLPSIEV                | TVGGGTQLAS | QSACLNLLGV | MGACKESPGS |           |
| YSRLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{rubbertrel1} | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGANKESPGS |           |
| NSRLLAAIVA                |                          |            |            |            |           |
| HMGRclustalW{camptothec}  | SVTMPSIEV                | TVGGGTQLAS | QSACLNLLGV | KGASKEAPGS |           |
| NARLLATIVA                |                          |            |            |            |           |
| HMGRclustalW{arabados2}   | SVSMPCIEV                | TVGGGTQLAS | QAACLNLLGV | KGSNNEKPGS |           |
| NAQQLARIVA                |                          |            |            |            |           |
| HMGRclustalW{chineseham}  | SCTMPSIEIG               | TVGGGTNLLP | QQACLQMLGV | QGACKDNPGE |           |
| NARQLARIVC                |                          |            |            |            |           |

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|                           |            |            |            |                 |
|---------------------------|------------|------------|------------|-----------------|
| HMGRclustalW{chineseha2}  | SCTMPSIEIG | TVGGGTNLLP | QQACLQMLGV | QGACKDNPGE      |
| NARQLARIVC                |            |            |            |                 |
| HMGRclustalW{syrianhamst} | SCTMPSIEIG | TVGGGTNLLP | QQACLQMLGV | QGACKDNPGE      |
| NARQLARIVC                |            |            |            |                 |
| HMGRclustalW{rat}         | SCTMPSIEIG | TVGGGTNLLP | QQACLQMLGV | QGACKDNPGE      |
| NARQLARIVC                |            |            |            |                 |
| HMGRclustalW{rabbit}      | SCTMPSIEIG | TVGGGTNLLP | QQACLQMLGV | QGACKDSPGE      |
| NARQLARIVC                |            |            |            |                 |
| HMGRclustalW{human}       | SCTMPSIEIG | TVGGGTNLLP | QQACLQMLGV | QGACKDNPGE      |
| NARQLARIVC                |            |            |            |                 |
| HMGRclustalW{mouse}       | SCTMPSIEIG | TVGGGTNLLP | QQACLQMLGV | QGACKDNPGE      |
| NARQLARIVC                |            |            |            |                 |
| HMGRclustalW{xenopus}     | SCTMPSIEIG | TVGGGTNLAP | QQACLQMLGV | QGASTETPGK      |
| NACQLAQIVC                |            |            |            |                 |
| HMGRclustalW{sea urchin}  | SCTMPSIEIG | TVGGGTVLPP | QSACLQMDV  | KGSNIHGSG       |
| NASQLARIVC                |            |            |            |                 |
| HMGRclustalW{cockroach}   | SCTMPSIEIG | TIGGGTVLPP | QAACLDMLGV | RGANEMCPGE      |
| NANTLARIVC                |            |            |            |                 |
| HMGRclustalW{drosophila}  | TCTMPSIEIG | TVGGGTGLPG | QSACLEMLGV | RGAHATRPGE      |
| NAKKLAQIVC                |            |            |            |                 |
| HMGRclustalW{dictyostel}  | TVTMSIEIG  | TVGGGTSLPA | QSACLDIIGV | KGSSSSKPGA      |
| NADQLAKTIA                |            |            |            |                 |
| HMGRclustalW{schistosom}  | SVTMPCIEIG | TVGGGTSLSG | QRACLDLLDL | SV.....D.R      |
| PTEHLSRIIA                |            |            |            |                 |
| HMGRclustalW{archaeoglo}  | GTIEIPMAVG | VIGGATKVNP | LAKISLKILG | VNTAEELARV AAAL |
| HMGRclustalW{pseudomonas} | GTLEMPMPVG | LVGGATKTHP | LAQLSLRILG | VKTAQALAEI AVAV |
| Consensus                 | SVTMPSIEIG | TVGGGTQLAP | QSACLNLLGV | KGA-KESPGS      |
| NARQLARIVA                |            |            |            |                 |

NADH binding domain 2

FIG.32 QQ

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1100  
 HMGRclustalW{methanobac} GAVLAGELSL MGALAAGHLA RAHSELGRG. ....  
 .....  
 HMGRclustalW{methanococ} AAVLAGELSL LGALAAGHLG KAHQELGR.. ....  
 .....  
 HMGRclustalW{halobacter} VGSLAGELSL LSALASRHLS SAHAELGR.. ....  
 .....  
 HMGRclustalW{sulfolobus} STVLSGELNL LAALSNKELG KAHAKLGRAM KV.....  
 .....  
 HMGRclustalW{ yeast2} CAVLAGELSL CSALAAGHLV QSHMTHNRK. ..TNKANELP  
 QPS.....  
 HMGRclustalW{ yeast1} CAVLAGELSL CAALAAGHLV QSHMTHNRKP AEPTKPNNLD  
 ATDI.....  
 HMGRclustalW{phycomyces} .....  
 .....  
 HMGRclustalW{ fusarium} AAVLAGELSL CSALAAGHLV RAHQHNRSA APSRSTTPGS  
 SHDARLTGHD  
 HMGRclustalW{ candida} SIVLSGELSL VSALAAGHLV QSHMQHNRAA AKK.....  
 .....  
 HMGRclustalW{dictyoste2} AAVLSGELSL MSALAAGHLV RSHLKHNKRKT EAPAPQADTI  
 SMTHNLPHSD  
 HMGRclustalW{wheat1} .....  
 .....  
 HMGRclustalW{ rice} GSVVAGRALL LAALASGHLV KSHMMYNRSS KDVAK.....  
 .....  
 HMGRclustalW{ corn} GSVLAGELSL LSALAAGQLV KSHMKYNRSS KDVSS.....  
 .....  
 HMGRclustalW{wheat3} .....  
 .....  
 HMGRclustalW{wheat2} .....  
 .....  
 HMGRclustalW{ soybean} GSVLAGELSL MSAIAAGQLV NSHMKYNRSS KDVTK.....  
 .....  
 HMGRclustalW{rubbertre3} GSVLAGELSL MSAIAAGQLV NSHMKYNRSA KDVS.....  
 .....  
 HMGRclustalW{rosyperiwi} GSVLAGELSL MSAISAGQLV RSHMKYNRSS KDITN.....  
 .....  
 HMGRclustalW{ tomato} GSVLAGELSL MSAISSGQLV NSHMKYNRST KDVTK.....  
 .....  
 HMGRclustalW{woodtobacc} GSVLAGELSL MSAISAGQLV KSHMKYNRST KDVTK.....  
 .....  
 HMGRclustalW{ potato} GSVLAGELSL MSAISAGQLV KSHMKYNRSI KDISK.....  
 .....  
 HMGRclustalW{radish} GAVLAGELSL MSAIAAGQLV RSHMKYNRSS RDISG.....  
 .....  
 HMGRclustalW{arabadosis1} GAVLAGELSL MSAIAAGQLV RSHMKYNRSS RDISG.....  
 .....  
 HMGRclustalW{cucumismel} GSVLAGELSL MSAIAAGQLV RSHMKYNRSS RDVSK.....  
 .....  
 HMGRclustalW{rubbertre2} GSVLAGELSL MSAIAAGQLV KSHMKYNRSS KDVS.....  
 .....  
 HMGRclustalW{rubbertrel} GSVLAGELSL MSAIAAGQLV KSHMKYNRSS KDMSK.....  
 .....  
 HMGRclustalW{camptothec} GSVLAGELSL MSAIAAGQLV NSHMKYNRSN KDVTK.....  
 .....  
 HMGRclustalW{arabados2} GSVLAGELSL MSAIAAGQLV KSHMKYNRSS RDIGP.....  
 .....  
 HMGRclustalW{chineseham} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....

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.....
HMGRclustalW{chinese2} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{syrianhamst} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{      rat} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{      rabbit} GTVMAGELSL MAALAAGHLV KSHMIHNRSK INLQD.....
.....
HMGRclustalW{      human} GTVMAGELSL MAALAAGHLV KSHMIHNRSK INLQD.....
.....
HMGRclustalW{      mouse} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{      xenopus} STVMAGELSL MAALAAGHLV KSHMVHNRSK INLQD.....
.....
HMGRclustalW{sea urchin} ATVMAGELSL MSALAAGHLV KSHMKHNRSA LNIASPLPSI
DEVATHRRSK
HMGRclustalW{  cockroach} GTVLAGELSL MSALAAGHLV KSHMRHNRSS VSTSG.....
.....
HMGRclustalW{drosophila} ATVMAGELSL MAALVNSDLV KSHMRHNRSS IAVNSAN...
.....
HMGRclustalW{dictyostel} SAVMAGELSL MSALSAGHLM KSHLQYNRAK TN.....
.....
HMGRclustalW{schistosom} GTVLAAELSL MAALDTDDLK KAHMHFNRAK QSTNSHSCSH
STTTDNDNDNI
HMGRclustalW{archaeoglo} ..GLAQNFAA LRALATEGIQ RGHMELHARN LAIMAGATGD
EVDVRVVEIMV
HMGRclustalW{pseudomonas} ..GLAQNLGA MRALATEGIQ RGHMALHARN IAVVAGARGD
EVDWVARQLV

Consensus GTVLAGELSL MSALAAGHLV KSHMK-NRSS KDVSK-----

```

\* †††

FIG. 32 SS



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HMGRclustalW{chineseha2} ..... LQGTCTK KSA.....  
 .....  
 HMGRclustalW{syrianhamst} ..... LQGTCTK KAA.....  
 .....  
 HMGRclustalW{ rat} ..... LQGTCTK KAA.....  
 .....  
 HMGRclustalW{ rabbit} ..... LEGACTK KAA.....  
 .....  
 HMGRclustalW{ human} ..... LQGTCTK KTA.....  
 .....  
 HMGRclustalW{ mouse} ..... LQGTCTK KAA.....  
 .....  
 HMGRclustalW{ xenopus} ..... LQGTCTK KAA.....  
 .....  
 HMGRclustalW{sea urchin} SVDFSALKES SAAAPGTCTA NAS.....  
 .....  
 HMGRclustalW{ cockroach} .....S ...EPSTPAC KS.....  
 .....  
 HMGRclustalW{drosophila} .....NP LNVTVSSCST IS.....  
 .....  
 HMGRclustalW{dictyostel} .....  
 .....  
 HMGRclustalW{schistosom} SNIYDNHNVA LSSKIPVTDN SDIRESVHSL HVKPPFPVKSD  
 LSVNPEISHY TM  
 HMGRclustalW{archaeoglo} RDGKIRLDYA KEVLRLRS. ....  
 .....  
 HMGRclustalW{pseudomonas} EYHDVRADRA VALLKQKRGQ .....  
 .....  
 Consensus -----A ---LQGTCTK KAA-----

Figure 1: ClustalW alignment of forty-three non-redundant HMG-CoA reductase sequences to represent archaeobacterial, eubacterial, fungal, plant and animal groups. The putative functional domains in the alignment marked as described below are based on the three dimensional structure of *Pseudomonas mevalonii* HMGR (Lawrence et al., 1995): boxed-HMGRCoA binding domain, light shade-NAD(H) binding domain, underlined consensus- domains involved in catalysis, \* underneath consensus and boldface-key histidine residue involved in catalysis. The putative phosphorylation site residues are marked with ‡ and boldface, and are located at the C-terminal region of the protein, adjacent to a highly conserved arginine, marked with † and boldface. Also indicated are the conserved Glu (E), Lys (K), and Asp (D) residues, marked by E, K, and D, respectively. These residues are thought to be critical in catalysis, based on the crystal structure (Tabernero et al., 1999).

FIG. 32 UU